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U. S. COMMISSION OF FISH AND FISHERIES,

GEORGE M. BOWERS, Commissioner.

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PART XXVI.

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REPORT

OF

THE COMMISSIONER

FOR

THE YEAR ENDING JUNE 30, 1900.

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## CONTENTS.

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|  | Page.   |
|--|---------|
| Report of the Commissioner.....  | 5-24    |
| Report on the Propagation and Distribution of Food-Fishes. By W. de C. Ravenel .....       | 25-118  |
| Report on Inquiry respecting Food-Fishes and the Fishing-Grounds. By Hugh M. Smith.....    | 119-135 |
| The Albatross South Sea Expedition. By H. F. Moore.....                                    | 137-161 |
| Report of the Division of Statistics and Methods of the Fisheries. By C. H. Townsend ..... | 163-184 |

### APPENDICES.

|  |         |
|--|---------|
| A method of recording egg development for use of fish-culturists. By Claudius Wallich. (Plate 1) .....   | 185-194 |
| Statistics of the Fisheries of the Middle Atlantic States.....   | 195-310 |
| Statistics of the Fisheries of the New England States.....   | 311-386 |
| Dredging and other records of the U. S. Fish Commission steamer Albatross, with Bibliography relative to the work of the vessel. Compiled by C. H. Townsend. (Plates I-VII)..... | 387-562 |



REPORT  
OF THE  
UNITED STATES COMMISSIONER OF FISH AND FISHERIES  
FOR THE  
FISCAL YEAR ENDING JUNE 30, 1900.

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I have the honor to submit a report covering the work of the United States Commission of Fish and Fisheries for the year ending June 30, 1900, together with the reports of its different divisions. This, with the papers published in the Bulletins of the Commission and as appendices to this report, describes in full its operations for the fiscal year.

PROPAGATION OF FOOD-FISHES.

The fish-cultural work has been very satisfactory as compared with previous records, notwithstanding the results in some directions have not been as good as usual. The total number of fish distributed was 1,164,336,754, an increase (which consisted principally of shad, cod, flat-fish, white-fish, and lake trout) of about 100,000,000 over the last fiscal year.

At the stations on the Pacific coast, for reasons beyond the control of the Commission, the collections of quinnat-salmon eggs were not as large as in the past few years, and there was consequently a considerable falling off in the output of this species. The excessive drought prevailing in California during the summer of 1899 caused such low water in Battle Creek and in the McCloud River that but few salmon ascended these streams as far as the hatcheries, the larger number depositing their eggs on spawning-grounds below. At Battle Creek, where previous collections of eggs have been almost phenomenal, only 1,600,000 were taken this year. On the McCloud eggs are taken during both the summer and fall runs of fish, and this year from the first run only 6,228,260 were collected, and from the fall run 186,800, making in all 6,414,060, against over 16,000,000 the year before. The eggs taken at the California hatcheries were all hatched in that State, and the fry were liberated in the Sacramento River and its tributaries and in the Eel River.

The results at the stations operated on the Columbia River were better, although the run of salmon was poor; the number of eggs permitted the liberation of 11,000,000 fry in the Columbia and its tributaries.



On the Rogue River the Commission operated a hatchery constructed by Mr. R. D. Hume and collected over 4,000,000 quinnat-salmon eggs, 1,800,000 of which were transferred to Mr. Hume's hatchery at Wedderburn, Oreg., where they were hatched. The fry were there kept in ponds and troughs until they had reached a length of 3 to 5 inches, and were fed during this time on canned salmon prepared from the scraps and waste portions of the fish. The success with this material was so encouraging that, so far as practicable, an attempt will be made to rear all salmon fry to the yearling stage before liberating them. Heretofore the question of a suitable food, which is not too expensive, has been one of the most important factors for consideration in rearing large numbers of fish at stations remote from railroad facilities, and the use of the canned salmon referred to will materially simplify the problem.

Steelhead-trout eggs were collected on Crystal Creek, a tributary of the Rogue River, as the number taken the previous year on the Willamette River did not warrant a continuation of the work at that point. The eggs were all sent to eastern stations to be hatched, in order to maintain the successful plants already made in the Great Lakes and elsewhere. The steelhead appears to thrive in the streams of Montana, and it may be noted that over 50,000 eggs of this species were taken by the superintendent of the Bozeman station from fish liberated two years ago in Bridger Creek, in that State.

At the new station on Baker Lake, Washington, the propagation of the sockeye or blueback salmon, regarded as perhaps the most important of the salmons in the Puget Sound region, from a commercial standpoint, was begun and over 10,600,000 fry were hatched and planted in the waters of Baker Lake and Skagit River. Located as this station is, in the center of a forest reserve, and with the lake and surrounding territory set aside for fish-cultural purposes, it is believed that it will be an important factor in preserving an extensive spawning-ground of this valuable fish.

The passage by the legislature of Michigan of an act allowing the U. S. Fish Commission to catch white-fish and lake trout for fish-cultural purposes during the close season, November 1 to December 15, permitted the propagation of these species on a much larger scale than usual, and as the State failed to provide funds for carrying on its work with the commercial fishes of the Great Lakes, this Commission was enabled to lease the Michigan white-fish hatcheries at Detroit and Sault Ste. Marie.

The collection of lake-trout eggs was undertaken on the most important spawning-grounds in Lake Michigan and continued until November 10, during which time over 15,000,000 were collected, at an almost nominal expense. As only about 10 per cent were taken prior to November 1, it will be seen that this work would have been almost a failure had the old law been in force. On Lake Superior, where



operations were conducted from the Duluth station, over 12,000,000 eggs were taken. The fry hatched from these eggs were planted on the spawning-grounds of the Great Lakes.

The white-fish work was carried on in Lake Erie from the station at Put-in Bay, at Monroe Piers, Michigan, and at the three fisheries on the Detroit River, which were operated as a result of arrangements with the Michigan Fish Commission. At the latter point more than 34,000 white-fish were penned, which yielded 244,000,000 eggs; 479,000,000 eggs were taken altogether, filling all of the available hatcheries, besides permitting 10,000,000 to be sent to the New York Fish Commission and nearly 6,000,000 to that of Pennsylvania. Over 337,838,000 white-fish eggs were hatched and the fry liberated, a gain of nearly 200,000,000 over the year before. As the majority of the eggs were obtained from fish which had been impounded or penned, the excellent results of the season's work verify the prediction in the report of last year as to the advantages of this manner of insuring a supply of spawn.

The taking of spawning pike-perch in Lake Erie was seriously interfered with by the backwardness of the spring, the ice remaining in the lake till an unusually late date, so that when nets could be set and fishing begun but few fish were found on the spawning-grounds. The inference is that numbers had already spawned. The season lasted but a few days, and only 138,000,000 eggs were taken at Put-in Bay, and these were of poor quality, producing but 57,000,000 fry.

The pike-perch season was also shortened in Vermont, where, from the experience of the previous year, good results were hoped for, but freshets in the Missisquoi River prevented the fish from ascending to spawn until April 14, and eggs were only taken between the 22d and 31st. Although 115,000,000 eggs were secured at this point, the percentage hatched was not satisfactory, for a cause which is not yet determined. Steps are now being taken to prevent, if possible, similar losses in future.

At the stations in New England devoted to the propagation of marine commercial fishes very satisfactory results have been attained. Brood cod-fish were captured and held in the pools at Woods Hole for spawning purposes, and collecting stations were established at Plymouth, Mass., and Kittery Point, Me., where spawn-takers could obtain eggs from fish taken by the fishing vessels. From the 2,200 fish impounded at Woods Hole 103,440,000 eggs were secured, and from other sources 251,505,000. These were hatched at the Woods Hole and Gloucester stations and yielded 265,324,000 fry, which were liberated at suitable points along the coast. This record exceeds any previous one by over 50,000,000. The fish remaining of the brood stock at Woods Hole were numbered, tagged, and recorded before liberation, in accordance with the plan of systematic observations concerning the migration, rate of growth, etc., of the cod, which has been already described.

The efforts to increase the production of flat-fish have been continued, and in the propagation of this species better results have been attained by abandoning the method pursued in the past of artificially fertilizing the eggs. This year the brood-fish were taken to Woods Hole and allowed to spawn naturally in tanks at the station, and the percentage of fry obtained greatly exceeded former results. From 102,000,000 eggs 87,115,000 fry were hatched and planted.

The hope was expressed in a previous report that some appreciable effect had been made on the lobster fishery by the efforts which have been made to increase the supply, but the scarcity of lobsters and consequent difficulty in obtaining egg lobsters from the fishermen, notwithstanding the cordial cooperation of the State fish commissions throughout New England, has made impossible a larger output of fry. All available means were employed to obtain the egg-bearing lobsters captured by fishermen along the entire New England coast. The schooner *Grampus* and a steam smack visited the fishing centers of Maine from April to July, and agents stationed at the more important ports from New Hampshire to Connecticut were authorized to purchase egg lobsters from both fishermen and dealers.

From points north of Cape Cod less than 5,000 lobsters were secured. These produced 63,300,000 eggs, which were hatched at Gloucester and yielded 58,600,000 fry. From points south of the cape only 28,000,000 eggs were secured, from which 22,600,000 lobsters were hatched at Woods Hole.

The continued decrease of the fishery is shown by the smaller number of men now engaging in it. In 1900 only 10 men fished for lobsters from Noank, Conn., and 1 man from Block Island, while in 1899 40 men were thus employed from the former point and 15 from the latter. In Buzzards Bay and vicinity a similar decrease was noted. At New Bedford, in 1899, the Commission obtained 347 egg lobsters, while during the present season only 26 were to be had.

The propagation of shad during the season just closed was attended with very good results, some 6,000,000 more fry being hatched and planted than the year before. The new station at Edenton, N. C., was in operation for the first time, and the work in Albemarle Sound was conducted from this point. The regular stations on the Potomac and Susquehanna rivers met with good success, though the season was backward and unfavorable conditions caused the cessation of work on the Potomac by the middle of May. On the Delaware, however, the run of shad was unusually large, the fish being caught in such numbers that there was almost no sale for them. The steamer *Fish Hawk*, which was stationed on this river at Gloucester, N. J., collected over 80,000,000 eggs between April 27 and May 31. In all, 316,000,000 eggs were obtained, from which 241,056,000 fry were hatched and planted.

The constantly increasing applications for the basses and the excel-

lent results attained by the introduction of these fishes east of the Rocky Mountains have made it difficult to meet the demands made during the past few years. While the stations established for this purpose have shown fairly good results, an auxiliary collecting station recently located on the Mississippi River at Bellevue, Iowa, enabled the Commission during the past year, at comparatively small expense, to materially increase its supply of the large-mouth black bass, the crappie, and some of the other sun-fishes. In the Mississippi Valley thousands of the commoner fishes which had been left by the receding waters in the ponds and lakes which are formed by overflows, and which dry up annually, have been transferred to the main river or some of its tributaries, and thus preserved.

The stocking of suitable streams with the various species of trout has been continued, special attention being paid to the distribution of brook trout, rainbow trout, and black-spotted trout. In New England the extent of the work with landlocked salmon and trout was impaired by the severe drought which prevailed throughout that section during the fall of 1899. In Vermont and New Hampshire large numbers of fish were lost by the drying up of streams which had heretofore never been affected in this manner, and in Maine the water in many of the large lakes became so low that the trout and the landlocked salmon were not able to ascend the streams to spawn, which, of course, resulted in a material reduction of the number of eggs collected.

An investigation during the fall of 1899 shows that a large number of Atlantic salmon passed over the falls at Bangor and reached the spawning-grounds at the headwaters of the Penobscot, and from what was learned it is believed that an auxiliary station for the collection of eggs of this species on the natural spawning-grounds of this fish may be profitably established and the supply obtained to better advantage than by the methods now followed.

The propagation of the grayling at the Bozeman station has been continued, and during the spring of 1900 over 3,500,000 eggs were collected, the majority of which will be hatched at Bozeman for stocking the streams of Montana, Idaho, Oregon, and Washington, although consignments have been sent to Colorado, Minnesota, and Michigan and some of the eastern stations with a view to introducing these fish in other waters.

The following tables show the output of the various stations, the total number of fishes distributed by species, and the number of fish and eggs furnished to the States and Territories during the fiscal year ending June 30, 1900.

*Fish and eggs furnished for distribution during the year ending June 30, 1900.*

| Source of supply.                  | Species.                | Eggs.      | Fry and fingerlings. | Adults and yearlings. |
|------------------------------------|-------------------------|------------|----------------------|-----------------------|
| Green Lake, Me                     | Landlocked salmon       | 65,000     |                      | 309,280               |
|                                    | Steelhead trout         |            |                      | 3,653                 |
|                                    | Golden trout            |            | 6,990                |                       |
|                                    | Brook trout             |            | 323,644              |                       |
|                                    | Lake trout              | 350,000    | 587,000              |                       |
| Craig Brook, Me                    | Atlantic salmon         | 550,000    | 908,073              | 542,649               |
|                                    | Landlocked salmon       | 75,000     | 10,000               | 73,493                |
|                                    | Rainbow trout           |            | 3,000                | 3,000                 |
|                                    | Brook trout             |            | 4,578                | 5,210                 |
|                                    | Steelhead trout         |            | 9,000                | 226                   |
|                                    | Scotch sea trout        | 10,000     | 35,000               | 51,647                |
| Grand Lake Stream, Me              | Landlocked salmon       |            |                      | 111,787               |
| Nashua, N. H.                      | Brook trout             |            | 113,000              |                       |
|                                    | Lake trout              |            | 284,630              |                       |
| St. Johnsbury, Vt                  | Brook trout             | 314,000    | 534,100              | 6,310                 |
|                                    | Steelhead trout         |            | 20,000               | 2,200                 |
|                                    | Lake trout              |            | 180,000              |                       |
|                                    | Grayling                |            | 20,000               |                       |
|                                    | Hybrid trout            |            |                      | 1,959                 |
|                                    | Landlocked salmon       |            |                      | 17,260                |
| Gloucester, Mass                   | Cod                     |            | 138,403,000          |                       |
|                                    | Lobster                 |            | 58,470,000           |                       |
| Woods Hole, Mass                   | Cod                     |            | 126,921,000          |                       |
|                                    | Flat-fish               |            | 87,115,000           |                       |
|                                    | Lobster*                |            | 18,696,000           |                       |
| Cape Vincent, N. Y                 | Lake trout              |            | 1,875,800            |                       |
|                                    | Brook trout             |            | 280,500              |                       |
|                                    | White-fish              |            | 27,400,000           |                       |
|                                    | Pike perch              |            | 38,000,000           |                       |
| Steamer Fish Hawk                  | Shad                    | 15,038,000 | 47,875,000           |                       |
| Battery Station, Md                | Shad†                   | 21,711,000 | 87,518,000           |                       |
| Fish Lakes, Washington, D. C.      | Shad                    |            |                      | 2,000,000             |
|                                    | Black bass, large-mouth |            |                      | 32,967                |
|                                    | Black bass, small-mouth |            |                      | 200                   |
|                                    | Crappie                 |            |                      | 400                   |
| Central Station, Washington, D. C. | Shad‡                   |            | 4,767,000            |                       |
|                                    | Rainbow trout           |            | 6,000                | 330                   |
|                                    | Lake trout              |            | 8,368                |                       |
|                                    | Landlocked salmon       |            | 3,850                |                       |
|                                    | White-fish              |            | 256,000              |                       |
| Bryan Point, Md                    | Shad§                   |            | 55,702,000           |                       |
| Wytheville, Va                     | Rainbow trout           | 190,000    |                      | 98,039                |
|                                    | Brook trout             |            |                      | 40                    |
|                                    | Black bass              |            |                      | 1,971                 |
|                                    | Rock bass               |            |                      | 4,400                 |
| Erwin, Tenn                        | Rainbow trout           |            |                      | 39,620                |
|                                    | Brook trout             |            |                      | 45,427                |
| Edenton, N. C                      | Shad                    |            | 6,590,000            |                       |
| Cold Springs, Ga                   | Black bass              |            |                      | 238                   |
|                                    | Bream                   |            |                      | 1,000                 |
| Put-in Bay, Ohio                   | White-fish              | 15,832,000 | 109,890,000          |                       |
|                                    | Pike perch              | 25,000,000 | 27,000,000           |                       |
| Northville, Mich. ¶                | Lake trout              | 3,150,000  | 6,535,000            | 88,000                |
|                                    | Brook trout             |            | 257,500              | 9,254                 |
|                                    | Rainbow trout           |            | 3,000                | 385                   |
|                                    | Loch Leven trout        | 20,000     | 8,000                |                       |
|                                    | Steelhead trout         |            |                      | 4,500                 |
|                                    | Grayling                |            | 56,000               |                       |
| Detroit, Mich                      | White-fish              | 800,000    | 102,000,000          |                       |
| Alpena, Mich. ¶                    | do.                     |            | 36,500,000           |                       |
|                                    | Lake trout              |            | 995,000              |                       |
| Sault Ste. Marie, Mich             | White-fish              |            | 25,000,000           |                       |

\* 3,767,000 lobster fry were also delivered by Woods Hole Station to Dr. H. C. Bumpus for scientific purposes.

† In addition to the above there were transferred to Central Station by Battery Station for hatching 8,015,000 shad eggs, and to Johns Hopkins Hospital for scientific purposes 5,000 shad eggs.

‡ In addition to the above there were liberated in Fish Lakes Station Ponds for rearing 2,849,000 shad fry; also 280,000 shad fry were furnished for experimental purposes at Central Station.

§ In addition to the above there were transferred to Central Station from Bryan Point Station for hatching 1,023,000 shad eggs.

|| In addition to the above there were transferred to stations of the U. S. Fish Commission for hatching 240,000 rainbow-trout eggs and 500 of same to Philadelphia, Pa., for scientific purposes.

¶ In addition to the above, there were transferred to stations of the Commission 2,460,000 lake-trout eggs and 23,798,000 white fish eggs, which does not include transfers to any of the substations in the State of Michigan.

*Fish and eggs furnished for distribution during the year, etc.—Continued.*

| Source of supply.                        | Species.                        | Eggs.     | Fry and fingerlings. | Adults and yearlings. |
|--|---------------------------------|-----------|----------------------|-----------------------|
| Duluth, Minn.-----                       | Lake trout *-----               | 1,550,000 | 9,047,000            | -----                 |
|  | Brook trout-----                |           | 91,000               | -----                 |
|  | Steelhead trout-----            |           | 148,500              | -----                 |
|  | Grayling-----                   |           | 34,000               | -----                 |
|  | White-fish-----                 |           | 20,000,000           | -----                 |
| Quincy, Ill. †-----                      | Black bass-----                 |           |                      | 36,248                |
|  | Warmouth bass-----              |           |                      | 250                   |
|  | Crappie-----                    |           |                      | 9,260                 |
|  | Sun-fish-----                   |           |                      | 2,100                 |
| Manchester, Iowa ‡-----                  | Brook trout-----                | 75,000    | 25,000               | 56,350                |
|  | Rainbow trout-----              |           |                      | 2,800                 |
|  | Loch Leven trout-----           |           |                      | 1,700                 |
|  | Grayling-----                   |           | 35,450               | -----                 |
|  | Black bass-----                 |           |                      | 102,660               |
|  | Rock bass-----                  |           |                      | 300                   |
|  | Warmouth bass-----              |           |                      | 1,600                 |
|  | Crappie-----                    |           |                      | 141,364               |
|  | Bream-----                      |           |                      | 50,400                |
|  | Pike-----                       |           |                      | 5,000                 |
|  | Pickereel-----                  |           |                      | 189                   |
|  | Yellow perch-----               |           |                      | 8,175                 |
|  | Cat-fish-----                   |           |                      | 4,024                 |
| Neosho, Mo.-----                         | Rainbow trout §-----            | 65,000    |                      | 57,664                |
|  | Black bass-----                 |           |                      | 8,610                 |
|  | Rock bass-----                  |           |                      | 10,300                |
|  | Strawberry bass-----            |           |                      | 7,797                 |
|  | Crappie-----                    |           |                      | 320                   |
|  | Quinnat salmon-----             |           |                      | 1,600                 |
| San Marcos, Tex.-----                    | Black bass-----                 |           |                      | 110,455               |
|  | Rock bass-----                  |           |                      | 5,690                 |
|  | Crappie-----                    |           |                      | 3,195                 |
|  | Bream-----                      |           |                      | 300                   |
| Leadville, Colo.  -----                  | Brook trout-----                | 95,000    | 233,000              | 30,000                |
|  | Black-spotted trout-----        | 75,000    |                      | 445,000               |
|  | Grayling-----                   |           | 21,000               | -----                 |
| Spearfish, S. Dak-----                   | Brook trout-----                | 50,000    | 123,000              | -----                 |
|  | Black-spotted trout-----        |           |                      | 15,000                |
| Bozeman, Mont.-----                      | Brook trout-----                |           |                      | 43,500                |
|  | Black-spotted trout-----        | 10,000    | 120,000              | 277,000               |
|  | Rainbow trout-----              |           |                      | 13,000                |
|  | Steelhead trout-----            |           |                      | 10,000                |
|  | Grayling ¶-----                 | 372,000   | 2,242,100            | 10,000                |
| Baird, Cal.-----                         | Quinnat salmon-----             | 2,905,000 | 3,533,950            | -----                 |
| Battle Creek, Cal. **-----               | do-----                         | 20,000    |                      | -----                 |
| Clackamas, Oreg.-----                    | Quinnat salmon-----             |           | 4,369,422            | -----                 |
|  | Silver salmon-----              |           | 146,824              | -----                 |
|  | Lake trout-----                 |           | 86,836               | -----                 |
|  | Rainbow trout-----              |           | 22,603               | -----                 |
|  | Steelhead trout-----            |           | 99,000               | -----                 |
|  | Grayling-----                   |           | 41,668               | -----                 |
|  | White-fish-----                 |           | 160,000              | -----                 |
| Rogue River, Oreg. ††-----               | Quinnat salmon-----             |           | 2,156,945            | -----                 |
|  | Steelhead trout-----            | 100,000   |                      | -----                 |
| Little White Salmon River, Wash. ††----- | Quinnat salmon-----             | 250,000   | 6,626,947            | -----                 |
| Baker Lake, Wash.-----                   | Sockeye or blueback salmon----- |           | 10,683,000           | -----                 |
|  | Steelhead trout-----            |           | 26,000               | -----                 |

\* In addition to the above, there were transferred to the U. S. Fish Commission station at Nashua, N. H., 300,000 lake trout eggs.

† In addition to the above there were transferred to the Neosho, Mo., station 615 black bass and 725 crappie by Quincy station. There were distributed from Quincy 4,480 rock bass which were produced at Neosho, Mo.

‡ In addition to the above there were collected at Bellevue and released in the Mississippi River 15,000 carp and 20,000 buffalo-fish which would otherwise have perished. 45,750 rainbow-trout eggs were transferred to hatcheries of the U. S. Fish Commission.

§ Besides the above there were transferred to Erwin station 34,600 rainbow-trout eggs.

¶ Besides the above there were transferred from Leadville station to other stations of the Commission, for hatching, 300,000 brook-trout eggs and 100,000 black-spotted-trout eggs.

¶ In addition to the above there were transferred to stations of the U. S. Fish Commission, for hatching, 442,000 grayling eggs.

\*\* In addition to the above there were transferred from Battle Creek to Baird station, for hatching, 1,224,300 quinnat-salmon eggs.

†† In addition to the above there were transferred to Clackamas and other stations of the U. S. Fish Commission, for hatching, 399,000 steelhead-trout eggs from Rogue River station.

‡‡ In addition to the above there were transferred to Clackamas from Little White Salmon station, for hatching, 2,436,000 eggs of the quinnat salmon.

*Distribution of fish and eggs among the States and Territories.*

| State or Territory.  | Species.            | Eggs.     | Fry and fingerlings. | Adult and yearlings. |
|----------------------|---------------------|-----------|----------------------|----------------------|
| Alabama              | Rainbow trout       |           |                      | 1,200                |
|                      | Black bass          |           |                      | 5,000                |
|                      | Rock bass           |           |                      | 974                  |
|                      | Bream               |           |                      | 200                  |
| Arizona              | Rainbow trout       |           |                      | 2,400                |
|                      | Black bass          |           |                      | 475                  |
|                      | Rock bass           |           |                      | 500                  |
|                      | Strawberry bass     |           |                      | 200                  |
| Arkansas             | Rainbow trout       |           |                      | 10,350               |
|                      | Black bass          |           |                      | 1,900                |
|                      | Rock bass           |           |                      | 900                  |
|                      | Strawberry bass     |           |                      | 200                  |
| California           | Quinnat salmon      | 2,905,000 | 3,533,950            |                      |
| Colorado             | Brook trout         | 10,000    |                      |                      |
|                      | Landlocked salmon   | 5,000     |                      |                      |
|                      | Rainbow trout       |           |                      | 8,500                |
|                      | Black-spotted trout |           |                      | 445,000              |
|                      | Brook trout         |           | 236,000              | 30,000               |
|                      | Grayling            |           | 20,500               |                      |
|                      | Black bass          |           |                      | 1,040                |
|                      | Shad                |           | 6,120,000            |                      |
| Connecticut          | Landlocked salmon   |           |                      | 5,000                |
|                      | Rainbow trout       | 30,000    |                      |                      |
|                      | Brook trout         | 20,000    | 24,985               |                      |
|                      | Lake trout          |           | 50,000               |                      |
| Delaware             | Black bass          |           |                      | 1,650                |
|                      | Lobster             |           | 1,868,000            |                      |
|                      | Shad                |           | 8,650,000            |                      |
|                      | Rainbow trout       |           |                      | 1,000                |
| District of Columbia | Black bass          |           |                      | 800                  |
|                      | Crappie             |           |                      | 500                  |
|                      | Shad                |           | 2,095,000            | 2,000,000            |
|                      | Landlocked salmon   |           | 3,850                |                      |
| Florida              | Rainbow trout       |           |                      | 330                  |
|                      | Shad                |           | 2,016,000            |                      |
|                      | Shad                |           | 2,037,000            |                      |
|                      | Rainbow trout       |           |                      | 3,299                |
| Georgia              | Black bass          |           |                      | 5,883                |
|                      | Crappie             |           |                      | 100                  |
|                      | Bream               |           |                      | 800                  |
|                      | Rainbow trout       | 10,000    |                      | 6,000                |
| Idaho                | Black-spotted trout | 10,000    | 100,000              | 15,000               |
|                      | Brook trout         | 15,000    |                      | 16,000               |
|                      | Grayling            |           |                      | 5,000                |
|                      | Black bass          |           |                      | 1,490                |
| Illinois             | Loch Leven trout    |           | 5,000                |                      |
| Indiana              | Brook trout         |           | 28,000               |                      |
|                      | Pike perch          |           | 1,800,000            |                      |
|                      | Black bass          |           |                      | 14,273               |
|                      | Rainbow trout       |           |                      | 1,300                |
| Indian Territory     | Black bass          |           |                      | 700                  |
|                      | Crappie             |           |                      | 400                  |
|                      | Rock bass           |           |                      | 300                  |
|                      | Loch Leven trout    |           |                      | 1,700                |
| Iowa                 | Rainbow trout       |           |                      | 1,800                |
|                      | Brook trout         |           | 25,000               | 37,350               |
|                      | Grayling            |           | 35,450               |                      |
|                      | Cat-fish            |           |                      | 4,000                |
|                      | Pike                |           |                      | 5,000                |
|                      | Yellow perch        |           |                      | 8,000                |
|                      | Black bass          |           |                      | 28,740               |
|                      | Crappie             |           |                      | 122,875              |
| Kansas               | Warmouth bass       |           |                      | 1,600                |
|                      | Bream               |           |                      | 50,000               |
|                      | Rainbow trout       |           |                      | 500                  |
|                      | Black bass          |           |                      | 7,405                |
| Kentucky             | Crappie             |           |                      | 2,955                |
|                      | Rock bass           |           |                      | 1,250                |
|                      | Brook trout         |           |                      | 1,080                |
|                      | Black bass          |           |                      | 7,850                |
| Louisiana            | Crappie             |           |                      | 3,600                |
|                      | Rock bass           |           |                      | 1,500                |
|                      | Black bass          |           |                      | 2,650                |
|                      | Strawberry bass     |           |                      | 270                  |
| Maine                | Atlantic salmon     |           | 908,073              | 541,858              |
|                      | Landlocked salmon   | 30,000    | 10,000               | 450,052              |
|                      | Steelhead trout     |           | 8,300                | 3,879                |
|                      | Rainbow trout       |           | 2,800                | 9                    |
|                      | Brook trout         | 318,222   | 5,210                |                      |
|                      | Lake trout          | 350,000   | 587,000              |                      |
|                      | Scotch sea trout    |           | 27,000               | 51,647               |



*Distribution of fish and eggs among the States and Territories—Continued.*

| State or Territory. | Species.            | Eggs.      | Fry and fingerlings. | Adult and yearlings. |
|---------------------|---------------------|------------|----------------------|----------------------|
| Maine               | Golden trout        |            | 6,990                |                      |
|                     | Lobster             |            | 30,575,000           |                      |
| Maryland            | Shad                | 21,711,000 | 92,527,000           |                      |
|                     | Rainbow trout       |            |                      | 2,437                |
|                     | Brook trout         |            |                      | 4,753                |
|                     | Black bass          |            |                      | 1,525                |
|                     | Crappie             |            |                      | 1,800                |
|                     | Cod                 |            | 3,000,000            |                      |
| Massachusetts       | Shad                |            | 500,000              |                      |
|                     | Landlocked salmon   | 30,000     |                      | 9,000                |
|                     | Rainbow trout       | 15,000     |                      |                      |
|                     | Brook trout         | 45,000     | 65,000               | 100                  |
|                     | Lake trout          |            | 25,000               |                      |
|                     | Scotch sea trout    | 10,000     | 8,000                |                      |
|                     | Hybrid trout        |            |                      | 100                  |
|                     | White-fish          | 300,000    |                      |                      |
|                     | Pike perch          |            | 1,000,000            |                      |
|                     | Black bass          |            |                      | 2,075                |
|                     | Cod                 |            | 262,324,000          |                      |
|                     | Flat-fish           |            | 87,115,000           |                      |
|                     | Lobster             |            | 43,093,000           |                      |
| Michigan            | Landlocked salmon   | 5,000      |                      |                      |
|                     | Steelhead trout     |            | 15,600               | 4,335                |
|                     | Loch Leven trout    |            | 3,000                |                      |
|                     | Rainbow trout       | 25,000     | 2,000                | 384                  |
|                     | Brook trout         |            | 206,000              | 154                  |
|                     | Lake trout          | 1,850,000  | 10,450,000           | 86,650               |
|                     | Grayling            | 200,000    | 56,000               |                      |
|                     | White-fish          |            | 177,340,000          |                      |
|                     | Pike perch          | 25,000,000 |                      |                      |
|                     | Black bass          |            |                      | 4,045                |
| Minnesota           | Steelhead trout     |            | 118,500              |                      |
|                     | Brook trout         |            | 59,000               | 14,000               |
|                     | Lake trout          |            | 3,550,500            |                      |
|                     | Grayling            |            | 24,000               |                      |
|                     | White-fish          |            | 400,000              |                      |
|                     | Black bass          |            |                      | 4,000                |
|                     | Crappie             |            |                      | 375                  |
|                     | Rock bass           |            |                      | 300                  |
| Mississippi         | Black bass          |            |                      | 8,746                |
| Missouri            | Quinnat salmon      |            |                      | 1,350                |
|                     | Rainbow trout       |            |                      | 14,589               |
|                     | Black bass          |            |                      | 4,075                |
|                     | Crappie             |            |                      | 5,490                |
|                     | Rock bass           |            |                      | 700                  |
|                     | Strawberry bass     |            |                      | 4,874                |
|                     | Warmouth bass       |            |                      | 250                  |
|                     | Sun-fish            |            |                      | 2,100                |
| Montana             | Rainbow trout       | 10,000     |                      | 7,000                |
|                     | Black-spotted trout |            | 20,000               | 165,000              |
|                     | Brook trout         | 20,000     |                      | 6,000                |
|                     | Grayling            |            | 2,242,100            | 5,000                |
| Nebraska            | Rainbow trout       |            |                      | 8,800                |
|                     | Brook trout         |            |                      | 4,000                |
|                     | Black bass          |            |                      | 2,300                |
| New Hampshire       | Atlantic salmon     | 20,000     |                      |                      |
|                     | Landlocked salmon   | 10,000     |                      | 14,600               |
|                     | Loch Leven trout    | 20,000     |                      |                      |
|                     | Rainbow trout       | 20,000     |                      | 1,550                |
|                     | Brook trout         | 20,000     | 50,000               |                      |
|                     | Lake trout          |            | 284,555              |                      |
|                     | White-fish          | 500,000    |                      |                      |
|                     | Pike perch          |            | 1,000,000            |                      |
|                     | Black bass          |            |                      | 490                  |
|                     | Lobster             |            | 1,625,000            |                      |
| New Jersey          | Shad                | 8,332,000  | 38,455,000           |                      |
|                     | Rainbow trout       |            |                      | 5,800                |
|                     | Brook trout         | 20,000     |                      | 1,000                |
|                     | Black bass          |            |                      | 10,000               |
| New Mexico          | Rainbow trout       |            |                      | 5,100                |
|                     | Brook trout         | 10,000     |                      |                      |
|                     | Black bass          |            |                      | 200                  |
| New York            | Shad                |            | 10,280,000           |                      |
|                     | Atlantic salmon     | 100,000    |                      |                      |
|                     | Landlocked salmon   | 20,000     |                      | 10,500               |
|                     | Rainbow trout       |            |                      | 400                  |
|                     | Brook trout         |            | 253,000              | 9,100                |
|                     | Lake trout          | 1,800,000  | 1,875,800            |                      |
|                     | White-fish          | 10,000,000 | 27,000,000           |                      |
|                     | Pike perch          |            | 21,300,000           |                      |

*Distribution of fish and eggs among the States and Territories—Continued.*

| State or Territory.  | Species.                       | Eggs.     | Fry and fingerlings. | Adult and yearlings. |
|----------------------|--------------------------------|-----------|----------------------|----------------------|
| North Carolina ..... | Shad .....                     |           | 6,445,000            |                      |
|                      | Rainbow trout .....            | 10,000    |                      | 17,750               |
|                      | Brook trout .....              |           |                      | 700                  |
|                      | Black bass .....               |           |                      | 600                  |
|                      | Crappie .....                  |           |                      | 800                  |
| North Dakota .....   | Brook trout .....              |           | 5,000                |                      |
|                      | Cat-fish .....                 |           |                      | 24                   |
|                      | Yellow perch .....             |           |                      | 170                  |
|                      | Pickereel .....                |           |                      | 185                  |
|                      | Black bass .....               |           |                      | 9,480                |
|                      | Crappie .....                  |           |                      | 300                  |
|                      | Rainbow trout .....            |           | 1,000                |                      |
| Ohio .....           | Brook trout .....              |           | 19,500               |                      |
|                      | White-fish .....               |           | 101,050,000          |                      |
|                      | Pike perch .....               |           | 25,000,000           |                      |
|                      | Black bass .....               |           |                      | 4,575                |
|                      | Crappie .....                  |           |                      | 400                  |
|                      | Rock bass .....                |           |                      | 1,700                |
|                      | Rainbow trout .....            |           |                      | 1,450                |
| Oklahoma .....       | Black bass .....               |           |                      | 1,925                |
|                      | Crappie .....                  |           |                      | 400                  |
|                      | Rock bass .....                |           |                      | 200                  |
|                      | Steelhead trout .....          |           | 99,000               |                      |
|                      | Rainbow trout .....            |           | 22,308               |                      |
| Oregon .....         | Black-spotted trout .....      |           |                      | 10,000               |
|                      | Brook trout .....              |           |                      | 2,000                |
|                      | Grayling .....                 |           | 41,668               |                      |
|                      | Silver salmon .....            |           | 146,824              |                      |
|                      | Quinnat salmon .....           |           | 6,526,367            |                      |
|                      | Shad .....                     | 6,006,000 | 2,925,000            |                      |
|                      | Atlantic salmon .....          | 250,000   |                      |                      |
| Pennsylvania .....   | Rainbow trout .....            |           | 6,000                | 49,400               |
|                      | Brook trout .....              |           | 27,500               | 13,400               |
|                      | Lake trout .....               |           | 8,368                |                      |
|                      | White-fish .....               | 5,832,000 | 256,000              |                      |
|                      | Pike perch .....               |           | 2,000,000            |                      |
|                      | Black bass .....               |           |                      | 4,860                |
|                      | Crappie .....                  |           |                      | 1,500                |
|                      | Shad .....                     |           | 1,000,000            |                      |
| Rhode Island .....   | Landlocked salmon .....        | 10,000    |                      |                      |
|                      | Brook trout .....              |           | 23,000               |                      |
|                      | Black bass (large-mouth) ..... |           |                      | 2,000                |
|                      | Black bass (small-mouth) ..... |           |                      | 200                  |
|                      | Shad .....                     |           | 2,012,000            |                      |
| South Carolina ..... | Rainbow trout .....            |           |                      | 400                  |
|                      | Black bass .....               |           |                      | 100                  |
|                      | Crappie .....                  |           |                      | 705                  |
| South Dakota .....   | Rainbow trout .....            |           |                      | 1,000                |
|                      | Black-spotted trout .....      |           |                      | 15,000               |
|                      | Brook trout .....              |           | 123,000              |                      |
|                      | Black bass .....               |           |                      | 8,600                |
|                      | Crappie .....                  |           |                      | 30                   |
| Tennessee .....      | Rainbow trout .....            |           |                      | 17,500               |
|                      | Brook trout .....              |           |                      | 19,239               |
|                      | Black bass .....               |           |                      | 2,400                |
|                      | Crappie .....                  |           |                      | 1,278                |
| Texas .....          | Rainbow trout .....            |           |                      | 500                  |
|                      | Black bass .....               |           |                      | 111,455              |
|                      | Crappie .....                  |           |                      | 3,145                |
|                      | Rock bass .....                |           |                      | 5,640                |
|                      | Strawberry bass .....          |           |                      | 2,000                |
|                      | Bream .....                    |           |                      | 300                  |
| Utah .....           | Landlocked salmon .....        | 10,000    |                      |                      |
|                      | Steelhead trout .....          | 10,000    |                      |                      |
|                      | Brook trout .....              | 55,000    |                      |                      |
|                      | Lake trout .....               | 500,000   |                      |                      |
|                      | Grayling .....                 | 72,000    |                      |                      |
|                      | Landlocked salmon .....        | 20,000    |                      | 19,335               |
|                      | Steelhead trout .....          |           | 19,650               | 2,200                |
| Vermont .....        | Rainbow trout .....            |           |                      | 1,500                |
|                      | Brook trout .....              | 164,000   | 483,885              | 6,209                |
|                      | Lake trout .....               | 300,000   | 105,000              |                      |
|                      | Hybrid trout .....             |           |                      | 1,859                |
|                      | Grayling .....                 |           | 20,000               |                      |
|                      | White-fish .....               |           | 400,000              |                      |
|                      | Pike perch .....               |           | 12,600,000           |                      |
|                      | Black bass .....               |           |                      | 600                  |
|                      | Shad .....                     |           | 27,245,000           |                      |
| Virginia .....       | Rainbow trout .....            |           |                      | 21,876               |
|                      | Brook trout .....              |           |                      | 1,473                |
|                      | Black bass .....               |           |                      | 4,845                |
|                      | Crappie .....                  |           |                      | 1,500                |
|                      | Rock bass .....                |           |                      | 4,200                |



*Distribution of fish and eggs among the States and Territories—Continued.*

| State or Territory. | Species.                         | Eggs.      | Fry and fingerlings. | Adult and yearlings. |
|---------------------|----------------------------------|------------|----------------------|----------------------|
| Washington .....    | Quinnat salmon .....             |            | 6,626,947            |                      |
|                     | Sockeye or blueback salmon ..... |            | 10,683,000           |                      |
|                     | Steelhead trout .....            |            | 26,000               |                      |
|                     | Black-spotted trout .....        |            |                      | 67,000               |
|                     | Brook trout .....                |            |                      | 13,500               |
|                     | Lake trout .....                 |            | 86,692               |                      |
| West Virginia ..... | White-fish .....                 |            | 160,000              |                      |
|                     | Rainbow trout .....              | 25,000     |                      | 14,448               |
|                     | Brook trout .....                | 25,000     |                      | 2,750                |
|                     | Black bass .....                 |            |                      | 6,975                |
| Wisconsin .....     | Crappie .....                    |            |                      | 3,500                |
|                     | Steelhead trout .....            | 75,000     | 15,000               |                      |
|                     | Brook trout .....                |            | 20,000               | 1,000                |
|                     | Lake trout .....                 |            | 2,250,000            |                      |
|                     | Grayling .....                   |            | 10,000               |                      |
|                     | White-fish .....                 |            | 12,600,000           |                      |
| Wyoming .....       | Black bass .....                 |            |                      | 6,500                |
|                     | Steelhead trout .....            | 25,000     |                      | 10,000               |
|                     | Rainbow trout .....              | 45,000     |                      |                      |
|                     | Black-spotted trout .....        | 75,000     |                      | 20,000               |
|                     | Brook trout .....                | 110,000    |                      | 6,000                |
|                     | Lake trout .....                 | 250,000    |                      |                      |
| Foreign countries:  | Grayling .....                   | 100,000    |                      |                      |
|                     | Lake trout .....                 |            | 304,500              |                      |
|                     | White-fish .....                 |            | 2,000,000            |                      |
|                     | England .....                    | 20,000     |                      |                      |
|                     | Ireland .....                    | 700,000    |                      |                      |
|                     | Shad .....                       | 35,000     |                      |                      |
|                     | Rainbow trout .....              | 250,000    |                      |                      |
|                     | Quinnat salmon .....             | 20,000     |                      |                      |
|                     | France .....                     | 10,000     |                      |                      |
|                     | Scotland .....                   | 20,000     |                      |                      |
|                     | Brook trout .....                |            |                      |                      |
|                     | Total .....                      | 88,682,000 | 1,070,756,779        | 4,897,975            |

*Summary of distribution.*

| Species.                         | Eggs.      | Fry and fingerlings. | Adults and yearlings. | Total.        |
|----------------------------------|------------|----------------------|-----------------------|---------------|
| Shad .....                       | 36,749,000 | 202,307,000          | 2,000,000             | 241,056,000   |
| Quinnat salmon .....             | 3,175,000  | 16,687,264           | 1,350                 | 19,863,614    |
| Atlantic salmon .....            | 550,000    | 908,073              | 541,858               | 1,999,931     |
| Landlocked salmon .....          | 140,000    | 13,850               | 508,487               | 662,337       |
| Silver salmon .....              |            | 146,824              |                       | 146,824       |
| Sockeye or blueback salmon ..... |            | 10,683,000           |                       | 10,683,000    |
| Steelhead trout .....            | 110,000    | 301,450              | 20,414                | 431,864       |
| Loch Leven trout .....           | 20,000     | 8,000                | 1,700                 | 29,700        |
| Rainbow trout .....              | 255,000    | 34,103               | 209,572               | 498,675       |
| Black-spotted trout .....        | 85,000     | 120,000              | 737,000               | 942,000       |
| Brook trout .....                | 534,000    | 1,967,092            | 195,021               | 2,696,113     |
| Lake trout .....                 | 5,050,000  | 19,577,415           | 86,650                | 24,714,065    |
| Scotch sea trout .....           | 10,000     | 35,000               | 51,647                | 96,647        |
| Golden trout .....               |            | 6,990                |                       | 6,990         |
| Hybrid trout .....               |            |                      | 1,959                 | 1,959         |
| Grayling .....                   | 372,000    | 2,449,718            | 10,000                | 2,831,718     |
| White-fish .....                 | 16,632,000 | 321,206,000          |                       | 337,838,000   |
| Pike perch .....                 | 25,000,000 | 64,700,000           |                       | 89,700,000    |
| Cat-fish .....                   |            |                      | 4,024                 | 4,024         |
| Pike .....                       |            |                      | 5,000                 | 5,000         |
| Pickrel .....                    |            |                      | 185                   | 185           |
| Yellow perch .....               |            |                      | 8,170                 | 8,170         |
| Black bass, large-mouth .....    |            |                      | 282,127               | 282,127       |
| Black bass, small-mouth .....    |            |                      | 200                   | 200           |
| Crappie .....                    |            |                      | 151,653               | 151,653       |
| Rock bass .....                  |            |                      | 18,164                | 18,164        |
| Strawberry bass .....            |            |                      | 7,544                 | 7,544         |
| Warmouth bass .....              |            |                      | 1,850                 | 1,850         |
| Sun-fish .....                   |            |                      | 2,100                 | 2,100         |
| Bream .....                      |            |                      | 51,300                | 51,300        |
| Cod .....                        |            | 265,324,000          |                       | 265,324,000   |
| Flat-fish .....                  |            | 87,115,000           |                       | 87,115,000    |
| Lobster .....                    |            | 77,166,000           |                       | 77,166,000    |
| Total .....                      | 88,682,000 | 1,070,756,779        | 4,897,975             | 1,164,336,754 |

## RAILROAD TRANSPORTATION.

The five cars of the Commission traveled 101,796 miles in distributing fish, and detached messengers and employees of the stations traveled 157,297 miles. Of the 118,503,583 fish thus transported there was a loss of 50,717.

The Commission is under obligations to the following railroads for material aid in extending the field of its distribution by furnishing free transportation:

| Name of railroad.                                | Cars. | Messen-<br>gers. | Name of railroad.                        | Cars.  | Messen-<br>gers. |
|--|-------|------------------|--|--------|------------------|
| Alamogordo and Sacramento Mountain Rwy           |       | 42               | Lake Shore and Michigan Southern Rwy     |        | 48               |
| Austin and Northwestern R. R.                    |       | 198              | Macon and Birmingham Rwy                 |        | 150              |
| Bangor and Aroostook R. R.                       | 3,018 | 577              | Maine Central R. R.                      | 2,204  | 2,607            |
| Boston and Maine System                          |       | 2,522            | Michigan Central R. R.                   | 2,002  |                  |
| Burlington, Cedar Rapids and Northern Rwy        | 2,233 | 790              | Missouri Pacific Rwy                     | 20     |                  |
| Central Vermont Rwy                              |       | 530              | Mobile and Ohio R. R.                    | 1,122  | 89               |
| Chesapeake and Ohio Rwy                          | 880   | 125              | Montana R. R.                            |        | 112              |
| Chicago and Northwestern Rwy                     |       | 1,292            | Montpelier and Wells River R. R.         |        | 228              |
| Chicago, Burlington and Quincy R. R.             | 1,698 | 4,693            | Northern Pacific Rwy                     | 6,761  |                  |
| Cleveland, Cincinnati, Chicago and St. Louis Rwy | 111   |                  | Omaha, Kansas City and Eastern R. R.     | 250    |                  |
| Colorado and Southern Rwy                        |       | 1,123            | Oregon Short Line R. R.                  | 740    |                  |
| Colorado Midland Rwy                             | 372   | 942              | Pere Marquette R. R.                     | 7,680  | 1,213            |
| Delaware and Hudson Co.                          | 384   |                  | Plant System                             | 574    |                  |
| Denver and Rio Grande R. R.                      |       | 5,734            | Portland and Rumford Falls Rwy           |        | 170              |
| Detroit and Mackinac Rwy                         | 646   | 373              | Rio Grande, Sierra Madre and Pacific Rwy |        | 300              |
| El Paso and Northeastern Rwy                     | 326   | 77               | Rutland R. R.                            |        | 384              |
| Florida Central and Peninsular R. R.             | 414   |                  | St. Johnsbury and Lake Champlain R. R.   |        | 897              |
| Florida East Coast Rwy                           |       | 250              | St. Louis and San Francisco R. R.        | 310    | 38               |
| Franklin and Megantic Rwy                        |       | 50               | St. Louis Southwestern Rwy               | 125    | 264              |
| Fort Worth and Denver City Rwy                   |       | 2,020            | San Antonio and Aransas Pass Rwy         |        | 348              |
| Grand Rapids and Indiana Rwy                     | 2,570 | 332              | Sandy River R. R.                        |        | 22               |
| Grand Trunk Rwy. System                          |       | 256              | Southern Pacific Co.                     |        | 2,100            |
| Great Northern Rwy                               | 1,535 |                  | Texas and Pacific Rwy                    | 2,656  | 1,449            |
| Gulf, Colorado and Santa Fe Rwy                  |       | 2,289            | Texas Central R. R.                      |        | 157              |
| Houston and Texas Central R. R.                  |       | 353              | Vandalia Line                            | 646    |                  |
| Illinois Central R. R.                           |       | 195              | Virginia and Southwestern Rwy            |        | 32               |
| International and Great Northern R. R.           |       | 2,937            | Wabash R. R.                             | 1,452  | 1,618            |
| Kansas City and Independence Air Line            | 20    |                  | Washington County R. R.                  | 204    | 204              |
| Kansas City, Fort Scott and Memphis R. R.        | 381   |                  | West Virginia Central and Pittsburg Rwy  | 262    | 14               |
| Kansas City Southern Rwy                         | 636   | 38               | Wilmington and Northern R. R.            |        | 57               |
|  |       |                  | Wisconsin Central Rwy                    | 514    |                  |
|  |       |                  | Total                                    | 42,746 | 40,239           |

## BIOLOGICAL INQUIRIES.

During the year the Commission has carried on a number of investigations and experiments with the object of giving practical assistance to the oyster industry. The results of the experiments in fattening oysters by increasing, in inclosed waters, the production of their natural food have given considerable encouragement. Oysters planted in the experimental claires at Lynnhaven, Va., reached a degree of fatness unrivaled save in a single limited area of the open waters of that famous oyster field, but they arrived at this condition too late in the season to make the result of immediate practical value. During the coming season certain changes will be made in the plant whereby a better circulation and aeration of the water will be attained. It is expected that this will result not only in an improvement in the general vitality of the oysters and an increase in the reproductive activity of the minute plants upon which they feed, but that the currents created will also place the food more abundantly within the reach of the oysters. The changes in the claire will be completed in time to allow a practical test during the ensuing season.

An investigation was carried on during the winter, with the assistance of the steamer *Fish Hawk*, to determine the reason for the failure of oyster-culture in North Carolina, and is referred to on pp. 119-120.

In August, 1899, Mr. H. F. Moore visited Willapa Bay, Washington, for the purpose of inquiring into the condition of the oysters planted there in 1894. It was found that they had been almost exterminated. At the end of the first year, according to the testimony of the oystermen, a large proportion of those planted had survived and were on the beds. This would indicate that they had not been injured by transportation across the continent. Subsequently, however, they gradually decreased in number, until at the time of Mr. Moore's visit but five oysters were found after a careful search under the guidance of persons familiar with the beds. So far as could be determined this diminution did not result from natural causes, and there is reason to suspect that some of the oystermen in the region have been so indifferent to their own interests and their obligations to the Fish Commission as to view the raiding of the planted beds with a lenient eye. Several private beds in the vicinity are reported to be doing well, but in these cases it is to somebody's immediate interest to protect the planted oysters from poachers.

Owing to the very few oysters taken it was impossible to make experiments in artificial fertilization of the eggs, although two of the females appeared to be ripe. No evidence of natural spawning of the eastern oyster was obtained, and it appeared that the water was too cold to be favorable for their reproductive activity. Culture in shallow inclosed or semi-inclosed ponds appears to be indicated as the most hopeful line of experiment with eastern oysters in this region.

During the year the equipment and facilities at Woods Hole laboratory, which has continued under the direction of Dr. H. C. Bumpus, have greatly improved. The number of able volunteer workers has increased, and much scientific work of practical and theoretical value has been accomplished.

During the summer the steamer *Fish Hawk* has been at the station and rendered important service in the investigation of the marine fauna. The schooner *Grampus* was engaged, under the supervision of the director, in continuing the investigation of the tile-fish, and obtained valuable data concerning its distribution.

Studies were conducted upon clam-culture, the migrations of fish, the economic utilization of certain waste products of the fisheries, the diseases of fishes, and other subjects of importance, which are mentioned in the report of the Division of Inquiry relating to Food-fishes. There is also in preparation a series of papers, which, when completed, will afford to students a much-needed means of identification of the marine animals of the southern coast of New England.

The laboratory at Beaufort was open until September 15, 1899, and was reopened June 1, 1900, and a number of able workers utilized its facilities. The spawning habits of various fishes, sponges, and crustacean parasites were studied, and the basis has been laid for profitable work in the future. At its last session Congress passed an act for the establishment of a permanent biological station on the coast of North Carolina, and as the vicinity of Beaufort offers exceptional advantages it is proposed to locate it at that point.

The urgent deficiency bill approved February 9, 1900, provided for a special investigation concerning the decline of the lobster and clam fisheries, with the object of devising measures for their relief, and in April the following commission was appointed for the purpose of carrying the act into effect: Dr. H. C. Bumpus, chairman; Dr. H. M. Smith, secretary; Mr. William de C. Ravenel, and Capt. E. E. Hahn. Promising results have been already attained with the soft-shell clam (*Mya arenaria*), but the lobster presents greater difficulties and will require comprehensive study.

During the fiscal year investigations of the inland waters to ascertain their biological and physical characteristics, their fitness for the introduction of new species, and the possibility of increasing their productiveness by artificial means have been prosecuted in Maine, New York, Pennsylvania, Ohio, Indiana, Michigan, and North Carolina. While some of the information gathered is capable of local application only, much is of broader significance and applicable to lacustrine waters in general.

Dr. W. C. Kendall continued his work on Sebago Lake, Maine, until about the middle of August, when, at the request of the State board of fish commissioners, he was ordered to Cobbosseecontee Lake, to inquire into the reasons for the nonsuccess of the plants of landlocked salmon which have been made therein. In this connection, a study

was made of the fauna, and the conclusion was reached that the abundance of predaceous fishes and the restricted spawning-grounds were responsible for the failure of the salmon to maintain itself.

The biological survey of Lake Erie was continued during July and August under the direction of Prof. Jacob Reighard. The hatchery at Put-in Bay was used as laboratory and headquarters, but various other parts of the lake were visited by members of the party. An account of the work is elsewhere given in the report.\*

A comprehensive study of the waters of the hydrographic basin of the Wabash River, Indiana, was undertaken by the Commission during the summer of 1899. A number of the lakes and rivers were studied with some care, but principal attention was paid to Lake Maxinkuckee, in Marshall County. Maxinkuckee is typical of the small glacial lakes of the Upper Mississippi Valley, and it was considered that a thorough investigation of the biological and physical features of its waters would develop facts common to all of the lakes of its class. The work began July 1 and was continued until the latter part of October by a party under the direction of Prof. B. W. Evermann. A topographic and hydrographic survey was begun, meteorological observations were carried on, collections were made illustrative of the flora and fauna of the lake and its immediate environment, and data were obtained concerning the habits and distribution of the various animals, especially the fishes.

Seneca Lake, in New York, and Lake Mattamuskeet, in North Carolina, have been visited and collections of their fishes have been made or arranged for.

Investigations upon the fishes of the principal river basins in West Virginia, begun in 1899, were conducted by a party under Mr. W. P. Hay. The Potomac, Greenbrier, Elk, and especially the Monongahela river systems were well examined. Until recent years these rivers were productive of fine food-fishes, but of late they have become sadly depleted, principally through the denudation of the forest lands, the pollution of the waters, dynamiting, damming of streams, and other changes in the conditions, principally due to industrial operations.

On the Pacific coast the studies of the salmon and other fishes have been continued in the eastern tributaries of the Sacramento. The explorations of the coastal streams begun in previous years have been extended between the northern boundary of California and the Columbia River, and a study of the fishes of the San Pedro River has almost been completed.

Considerable progress upon the study of the collections made by the *Fish Hawk* in Porto Rico during the winter of 1898-99 is reported. The specimens were distributed among a number of specialists, and many of the reports have been received and several are now in progress. These papers will make an important and attractive publication, which it is hoped to issue during the ensuing year.

## STATISTICAL INQUIRIES.

During the last calendar year a statistical canvass of the fisheries of the States of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, and New York has been in progress. The present amount of capital invested in these fisheries in the New England States is \$19,637,036, which, as compared with the figures of the last canvass, made in 1889, shows a decrease of \$437,758. But this decrease is only apparent, being caused chiefly by the transfer of the menhaden industry to New York, and, while the relative values of the different catches have changed, the food fisheries of these States have, in the aggregate, increased in quantity and decreased but slightly in value. 35,445 persons are employed and 1,427 vessels, valued with their equipment at \$4,224,339. The total product is 393,355,570 pounds, worth \$9,672,702—the fishery for cod, cusk, haddock, hake, and pollock ranking first with a value of \$2,798,109, followed by the oyster fishery of Rhode Island and Connecticut, worth \$1,910,684. The lobster fishery is next in commercial importance, being worth \$1,276,900. While the catch has fallen from 30,500,000 pounds in 1889 to 14,660,000 in 1898, a decrease of more than 50 per cent, the price of lobsters has so advanced that the value of the industry has increased a corresponding degree.

The inquiry conducted on Lake Erie in the calendar year 1899 shows a decided increase in the fisheries of this lake since the last canvass, in quantity and value of the product, capital invested, and number of persons employed. This is chiefly shown in the catch of white-fish and lake herring. The yield of pike perch, though large, is not considerably greater than in former years. 3,728 persons and 104 vessels are engaged in the industry, representing an investment of \$2,719,600. In 1899, 58,393,000 pounds of products were obtained, worth \$1,150,890. A feature of the fisheries is the number of carp which were taken, the catch amounting to over 3,600,000 pounds, valued at \$51,400.

On Lake Ontario, where for several years there has been a decided falling off in the commercial fisheries, there was in 1899 found to be a material improvement, the yield being nearly three times as great as in 1897, and it would appear that this region is beginning to feel the effect of the fish-cultural operations which have been conducted here. The number of persons engaged and capital invested are also proportionately greater. The yield in 1899 amounted to nearly 2,500,000 pounds, valued at over \$100,000.

The quantity of fishing products landed at Boston and Gloucester shows an increase of more than 33,000,000 pounds, with an increased value of over \$1,200,000. The bulk of the increase is to be credited to Gloucester, though the fares landed at Boston are in excess of the year before. The products landed from American vessels at the two ports amounted to 176,774,301 pounds and were valued at nearly \$4,200,000.

Inquiries now in progress along the Great Lakes and in the Mississippi Valley show that an increasing number of carp are being caught



and shipped, chiefly to the markets of the larger eastern cities. From Lake Erie and the Ohio River and certain of its tributaries the quantity of this species taken is nine times as great as it was six-years ago. From the Illinois River more carp are taken than all other species combined, the catch for 1899 amounting to 6,332,900 pounds, valued at \$189,900. It would appear that this fish will become more and more an important factor in the food-fish supply of the country.

As it was not practicable for an agent of the Commission to visit Alaska during the summer of 1899, the customary records of the fur-seal herds were made up from data furnished by the courtesy of the resident Treasury agents. The American herd continues to decrease in numbers through the continuance of pelagic sealing, and the recent counts show that fewer pups are born each year.

#### STEAMER ALBATROSS.

During the spring of 1899 it was determined to undertake an investigation among the islands of the southern Pacific Ocean, as it was believed important additions to knowledge could be made in regions where comparatively little work had been done. The scientific work was placed in charge of Mr. Alexander Agassiz, who was accompanied by a staff of assistants.

At the beginning of the fiscal year the *Albatross* was prepared for the expedition, and on August 23 she sailed from San Francisco under the command of Commander Jefferson F. Moser, U. S. N., and until early in the spring, when she reached Yokohama, she was engaged in the work of exploration and biological investigation. The Marquesas, Paumotu, Society, Cook, Tonga, Fiji, Ellice, Gilbert, Marshall, Caroline, and Ladrone archipelagoes were visited, and at the various ports every facility and courtesy were extended by the local authorities, and thanks are due to the governments of Great Britain, France, and Germany, which at the request of the Department of State had directed their representatives in their respective possessions to afford any assistance in their power.

These islands were studied in relation to their geological and biological features, and collections were made in the fields of zoology, botany, ethnology, and geology. The director devoted his attention to the study of coral formations and the biological and dynamic factors which have resulted in the production of coral islands; the civilian staff were engaged in biological research, and the naval officers, besides their duties in navigating the ship, in making surveys, soundings, and observations of value to mariners. Collections of the fauna of the deeper waters of the Pacific were made by means of the beam trawl and dredge, and the pelagic life at the surface and intermediate depths was studied. During the cruise about 250 soundings were made, with numerous temperature and density observations. The *Albatross* arrived at Yokohama March 4, and after she was refitted, some collections were made on the coast of Japan, within the

100-fathom line and along the edge of the Black Current, until June 12, when the vessel left for Alaska to continue the commercial investigation of the salmon fisheries, on which she was engaged in 1897.

The full reports of this expedition are not yet ready for publication, but a narrative of the voyage will be found on pp. 137-161 of this volume.

#### STEAMER FISH HAWK.

During July and August this vessel, under the command of Mate James A. Smith, U. S. N., was employed in making collections of marine fauna off the southern coast of New England in connection with the biological work of the station at Woods Hole, Mass., and in September she was sent to Beaufort, N. C., to assist in the topographic and hydrographic surveys incident to an inquiry into the cause of the failure of the various attempts at oyster-culture which had been made in that State.

As the time during which the vessel could be available was limited, and as it was desired to make the investigation with some degree of thoroughness, it was considered advisable to limit the field of operations, and the regions examined were selected upon the suggestion of Prof. J. A. Holmes, director of the North Carolina geological and natural history survey, who took keen interest in the subject. At first the work was carried on in the vicinity of Beaufort and Morehead, but in December the *Fish Hawk* proceeded to Pamlico Sound, where Swan Quarter Bay and other productive oyster-grounds were examined. Reports upon the work are in course of preparation and will be published.

On March 25 the vessel was detached from this duty in order to prepare for taking up the customary shad work in the Delaware River. Some time was spent in making necessary repairs at Baltimore, and on April 25 she reached her usual anchorage off Gloucester City, N. J., where shad hatching was successfully carried on until the middle of June, when she was ordered to proceed to Woods Hole. The work above referred to is described in detail in the accompanying reports of the divisions of Scientific Inquiry and of Fish-Culture.

#### NEW STATIONS.

The development of Cold Spring station, near Bullochville, Ga., and of the stations at Edenton, N. C., and Nashua, N. H., has been carried on during the year, and has been sufficient to permit the beginning of fish-cultural operations.

The water supply at Cold Spring is derived from three springs with an aggregate flow estimated at 2,800 gallons per minute and having a temperature of 62° to 64°. The principal spring has been surrounded with a substantial retaining-wall, a distributing-tank and conduits built, and five ponds finished with their supply and outlet pipes. Four of the ponds contain from 6,000 to 12,000 square feet each, and



all aggregate a little over an acre. A large portion of the property has been fenced in, roads built, and the grounds, which were rough and uneven, have been cleared and graded, marshy places filled, and a system of drainage laid out and completed. In the spring plans for a superintendent's dwelling were prepared, which will be a frame building of two stories, 48 by 52 feet, with wide halls and porches and containing seven rooms. Its construction is now in progress.

At Edenton, N. C., five artesian wells with 2-inch pipes were driven, ranging from 50 to 200 feet in depth, which furnished an average flow of about 3 gallons each per minute, the temperature of the water being 64° F. A two-story frame dwelling, 46 by 63 feet, containing eight rooms, has been completed for the superintendent, certain improvements have been made in the hatchery supply system, a supply ditch leading from Pembroke Creek to the boiler house has been completed, and the construction of six bass ponds has been begun.

At Nashua, N. H., a two-story frame residence, 30 by 50 feet, containing eight rooms, a cellar, and attic, has been erected for the superintendent, and additional drainage pipes laid.

#### MISCELLANEOUS.

For several years it has been very desirable that the Commission should have another steamer of sufficient size and seaworthiness for cruising at considerable distances offshore, in connection with the scientific and fish-cultural work of the New England stations. Accordingly, under authority of an act of Congress approved March 3, 1899, a steamer of 55 tons displacement, 82 feet long, and 16 feet beam was purchased November 23, 1899, and named *Phalarope*. In May she was put in commission, and has given satisfactory service.

There have been added to the library during the year 130 books and 318 pamphlets. The Bulletin for 1898 and the following pamphlet extracts from the Bulletins for 1898 and 1899, and from the Report for 1899, have been issued:

- The salmon and salmon fisheries of Alaska. Report of the operations of the U. S. Fish Commission steamer Albatross for the year ending June 30, 1898, by Jefferson F. Moser. Bulletin for 1898, pp. 1-178.
- List of fishes known to inhabit the waters of the District of Columbia and vicinity, by Hugh M. Smith and Barton A. Bean. Bulletin for 1898, pp. 179-188.
- Notes on the collection of tide-pool fishes from Kadiak Island, Alaska, by Cloudsley Rutter. Bulletin for 1898, pp. 189-192.
- The southern spring mackerel fishery of the United States, by Hugh M. Smith. Bulletin for 1898, pp. 193-271.
- Notice of file-fish new to the fauna of the United States, by Hugh M. Smith. Bulletin for 1898, pp. 273-278.
- The pearly fresh-water mussels of the United States; their habits, enemies, and diseases, with suggestions for their protection, by Charles T. Simpson. Bulletin for 1898, pp. 279-288.
- The mussel fishery and pearl-button industry of the Mississippi River, by Hugh M. Smith. Bulletin for 1898, pp. 289-314.
- The peripheral nervous system of the bony fishes, by C. Judson Herrick. Bulletin for 1898, pp. 315-320.
- The reappearance of the tile-fish, by Hermon C. Bumpus. Bulletin for 1898, pp. 321-333.
- The preservation of fishery products for food, by Charles H. Stevenson. Bulletin for 1898, pp. 335-563.

- Notes on the foreign fishery trade and local fisheries of Porto Rico, by W. A. Wilcox. Report for 1899, pp. 1-34.
- Check-list of the fishes of Florida, by B. W. Evermann and W. C. Kendall. Report for 1899, pp. 35-103.
- Statistics of the fisheries of the Gulf States, Division of Statistics, C. H. Townsend, assistant in charge. Report for 1899, pp. 105-169.
- Statistics of the fisheries of the South Atlantic States, Division of Statistics, C. H. Townsend, assistant in charge. Report for 1899, pp. 171-227.
- An inquiry into the feasibility of introducing useful marine animals into the waters of Great Salt Lake, by H. F. Moore. Report for 1899, pp. 229-250.
- A review of the fisheries in the contiguous waters of the State of Washington and British Columbia, by Richard Rathbun. Report for 1899, pp. 251-350.
- Experiments in photography of live fishes, by R. W. Shufeldt. Bulletin for 1899, pp. 1-5.
- Notes on the tide-pool fishes of California, with a description of four new species, by Arthur White Greeley. Bulletin for 1899, pp. 7-20.
- The synaptas of the New England coast, by Hubert Lyman Clark. Bulletin for 1899, pp. 21-31.
- Descriptions of new genera and species of fishes from Porto Rico, by B. W. Evermann and M. C. Marsh. Report for 1899, pp. 351-362.

There have been distributed during the year 1,429 bound and 12,394 pamphlet copies of the publications of the Commission.

The Museum of Comparative Zoology at Cambridge, Mass., has published the following additional papers based on the investigations of the steamer *Albatross* in 1891:

- Bulletin, vol. xxxv, No. 1, xxvii. Preliminary account of *Planktonemertes agassizii*, a new pelagic nemertean, by W. McM. Woodworth.
- Memoirs, vol. xxiii, No. 2, xxv. The Ophiuridæ, by C. F. Lutken and Th. Mortensen.
- Memoirs, vol. xxiv, No. xxvi. The Fishes, by S. Garman.

Appropriations were made by Congress for conducting the operations of the Commission for the year ending June 30, 1900, as follows:

|  |           |
|--|-----------|
| Salaries .....   | \$218,000 |
| Miscellaneous expenses:  |           |
| Administration .....   | 10,000    |
| Propagation of food-fishes .....                                     | 150,000   |
| Inquiry respecting food-fishes .....                                 | 15,000    |
| Statistical inquiry .....  | 5,000     |
| Maintenance of vessels .....   | 30,500    |
| For improvement of stations at—                                      |           |
| Leadville, Colo .....  | 4,000     |
| Woods Hole, Mass .....   | 5,000     |
| For construction of a wharf at Gloucester (Mass.) station .....      | 2,500     |
| For purchase of a steam launch for use at New England stations ..... | 7,000     |
| For continuing investigations regarding lobsters and clams .....     | 7,500     |

A report of the expenditure of these amounts will be made to Congress, in accordance with law.

GEORGE M. BOWERS, *Commissioner*.

# REPORT ON THE PROPAGATION AND DISTRIBUTION OF FOOD-FISHES.

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By W. DE C. RAVENEL, *Assistant in Charge.*

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## PROPAGATION OF FOOD-FISHES.

Fish-cultural work was conducted on the same general lines as in the past, but the results far exceeded those of any previous year. The total number of fish distributed was 1,164,336,754, an increase of about 100,000,000 over the output of the preceding year.

On the Pacific coast special attention was paid to the collection and hatching of quinnat-salmon eggs on the Sacramento River, in the Columbia River Basin in Washington and Oregon, and on the Rogue River. Owing to the excessive drought prevailing in California during the summer of 1899, the water was so low in Battle Creek that but few salmon ascended the stream, and the majority deposited their eggs on sand bars in the Sacramento. As a result only 1,600,000 eggs were taken at this point, where 20,000,000 were taken the previous year and 48,000,000 two years before.

At Baird station, on the McCloud River, a tributary of the Sacramento, where egg collections are made from both the summer and fall runs, the work was affected by the same cause. From the first run 6,228,260 were collected, and from the fall run 186,800, making in all 6,415,060. This was very discouraging, as over 16,000,000 had been taken the previous year with poorer facilities. The eggs were all hatched in California and the fry liberated in the Sacramento River and tributaries and in Eel River.

In the Columbia River Basin stations were operated on the Little White Salmon River in Washington and on the Clackamas River in Oregon; and though the run of salmon in the Columbia River was poor, 10,385,000 eggs were obtained on the Little White Salmon and 2,014,900 on the Clackamas, which resulted in the liberation of 10,997,947 fry in this region. Several hundred thousand of these were retained in Clackamas until they were from 4 to 6 inches long before being liberated.

On the Rogue River 4,364,800 quinnat-salmon eggs, 200,000 silver-salmon eggs, and 530,000 steelhead-trout eggs were collected. Of the quinnat-salmon eggs 1,800,000 were transferred to Wedderburn, Oreg.; the fry resulting were not planted until they were from 3 to 5 inches in length. They were fed on canned salmon, principally the backs of heads and the tails, which are of no commercial value. The

remainder were hatched at the station, and the 2,156,000 fry resulting were liberated in the Rogue River.

As the collection of steelhead-trout eggs on the Willamette the previous year had been very unsatisfactory, arrangements were made to collect on Crystal Creek, a tributary of the Rogue River, about 10 miles above the salmon station. This work proved fairly satisfactory, and it is believed, with the experience gained, that large numbers can be secured next season. The eggs were all forwarded to eastern stations, as plants previously made indicate that the steelhead is well adapted not only for the Great Lakes, but for lakes and streams in Montana and many of the Eastern States.

The propagation of the sockeye or blueback salmon, the most important commercial species on Puget Sound, was undertaken for the first time at Baker Lake, and as a result 10,683,000 fry were planted in Skagit River and the lake.

On the Great Lakes the white-fish and lake-trout work was the most satisfactory ever accomplished. Arrangements were made early in the fall for the collection of lake-trout eggs at Charlevoix, Beaver Island, and Manistique, Lake Michigan, near which are located the most important spawning-grounds of this species. Over 15,000,000 eggs were collected by November 10, but as only about 10 per cent were taken prior to November 1 the work would have been a complete failure under the old law, which provided for a rigid close season commencing on that date. On Lake Superior the season was very successful, over 12,000,000 being taken. The majority of the fry resulting from the total number collected, 27,000,000, were planted on the spawning-grounds of the Great Lakes. The white-fish work was energetically directed on Lake Erie; large numbers of adult fish were penned, as heretofore, at Put-in Bay, Ohio, and Monroe Piers, Michigan, which yielded 235,000,000 eggs. From the three fisheries on the Detroit River, operated as a result of arrangements made with the State commission, over 34,000 white-fish were penned, which yielded 224,000,000, making 459,000,000 eggs collected at the two stations. As a result of the year's work over 337,838,000 white-fish fry were liberated in the Great Lakes, more than double as many as in 1899.

The spring proved most unfavorable for the collection of pike-perch eggs on Lake Erie. Ice remained in the lake for weeks later than usual, so that by the time the fishermen were enabled to set their nets the season was actually over in the neighborhood of Port Clinton, Sandusky, Toledo, and the other important grounds. About 138,000,000 eggs were collected by the force of spawn-takers employed at Put-in Bay, but these were of poor quality and produced only about 57,000,000 fry, which were liberated in Lake Erie and some of the inland lakes of Ohio, Indiana, and Michigan. The collecting station on the Missisquoi River in Vermont, which had proved so promising the preceding year, was opened in April, but the immense amount of snow in the mountains at the headwaters of the Missisquoi melting

at that time caused freshets, which prevented the fish from ascending until April 14, and consequently shortened the season. The season here commenced April 22 and continued until the 31st, during which period 115,000,000 eggs were collected from 1,859 females; 85,225,000 eggs were transferred to Cape Vincent and the balance hatched and distributed under direction of the Vermont Commission. From the Cape Vincent hatchery 25,000,000 fry were distributed, making a total of 37,500,000 as a result of the season's work on the Missisquoi River.

It is difficult to account for the large loss that occurs in hatching pike-perch eggs, unless it is that they are unfertilized. Unfortunately the collecting stations are so distant from the regular station that we have been unable, up to this time, to make careful microscopic examinations to show whether this loss is due to the lack of fertilization or to injury in transportation. It is believed by the superintendent of the Cape Vincent station that very much better results would be secured if the eggs were eyed at the point where they are collected, and transferred afterwards. With a view to determining this matter definitely arrangements were made to erect a small hatchery at Swanton, but it was not only too small to handle the eggs collected, but the water supply was of such poor quality that it was necessary to keep men at work night and day clearing away the trash brought down by the melting snows; consequently the results were very unsatisfactory and no definite conclusions have yet been reached.

Early in October arrangements were made for the collection of brood cod for the Woods Hole station; also for the establishment of auxiliary collecting stations at Plymouth, Mass., and Kittery Point, Me., to supply the Gloucester and Woods Hole stations with eggs. The schooner *Grampus* during the months of October and November captured and delivered at Woods Hole 2,200 brood cod varying from 6 to 20 pounds. These commenced to spawn in November and yielded 103,440,000 eggs. In addition to these the station received from the spawn-takers stationed at Plymouth 71,275,000 cod eggs collected from fishing vessels which ply from that port. The work at Kittery was even more successful than in the past and the eggs collected were of superior quality, due largely to the exceptionally good weather which prevailed from November to February. From this point 180,230,000 cod eggs were shipped to Gloucester between November 28 and March 23, which, with the shipments from Plymouth, gave the station an aggregate of 198,880,000. As a result of the work at the two stations, 265,324,000 cod fry were liberated along the coast of New England from December to March. The results were very gratifying, being over 50,000,000 greater than ever before. The adult cod which survived the spawning operation were tagged and liberated from the Woods Hole station, as heretofore, with a view to getting additional data with reference to their migrations, rate of growth, etc; 1,311



were turned loose, and before the close of the year 11 were captured between Chatham and the New Jersey coast.

It was decided to take up the flat-fish work early in January, as past experience seemed to indicate that a large number of fish spawned during that month or early in February. The work was somewhat delayed by the presence of ice in the bays in which the nets were set, but the season proved very satisfactory; over 102,000,000 eggs were collected, which yielded 87,115,000 fry. In view of the fact that very unsatisfactory results had been secured during the past two or three years where the eggs had been artificially fertilized, it was determined this season to allow the fish to spawn naturally in the tanks at the station, and the results were most satisfactory.

Owing to the continued decrease of the lobster fishery, strenuous efforts have been made during the past two years to increase the output of lobster fry, but the scarcity of lobsters and the difficulties encountered in getting the egg lobsters from the fishermen, notwithstanding the cordial cooperation of State fish commissions throughout New England, has made this impossible. Arrangements were made during the winter months to collect all of the egg-bearing lobsters captured from Eastport to New York. The *Grampus*, assisted by a steam smack, plied along the coast of Maine, and visited all of the important fishing centers from early in April to July. Besides this, local agents were stationed from Kittery to New London, Conn., who purchased egg lobsters, not only from the fishermen, but also from the dealers in large towns. These were then transferred to Woods Hole and Gloucester by sail and steam boats provided for this purpose. Notwithstanding the efforts made, only 4,643 egg lobsters were secured north of Cape Cod. These yielded 63,335,000 eggs, from which were hatched 58,560,000 fry, which were deposited on suitable grounds along the coast. At Woods Hole only 28,140,000 eggs were secured and 22,643,000 hatched.

The propagation of shad was conducted as usual on the Albemarle Sound, the Potomac River, the Susquehanna, and the Delaware. The establishment of a new shad station at Edenton, N. C., obviated the necessity of our utilizing the *Fish Hawk* at that point. The season was very backward, and at one time it appeared as though the work would be materially reduced. The run of shad on the Potomac was seriously affected by the unfavorable conditions and work practically ceased by the middle of May, but operations were vigorously pushed until the end of the month on the Delaware and Susquehanna rivers. The number of eggs collected at the four stations aggregated 316,000,000, which produced 241,056,000 fry, an excess of about 6,000,000 over the previous season. The results secured on the Delaware were particularly gratifying. The run of shad was immense, the fish being caught in such large numbers that there was practically no sale. The *Fish Hawk* between April 27 and May 31, when operations ceased on account of lack of funds, had collected over 80,000,000 eggs.

The propagation of the basses and other fishes suitable for stocking inland lakes and streams was conducted as usual at the various stations provided for this purpose. The results were very gratifying. Notwithstanding the fact that there has been a large increase in the number of applications filed during the year, especially for the basses, all demands were met.

The following stations and auxiliary stations were operated during the year, and the work accomplished at each is reviewed in detail in the abstracts from the reports of the various superintendents:

Green Lake, Maine.  
 Craig Brook, Maine.  
 Grand Lake Stream, Maine.  
 St. Johnsbury, Vermont.  
 Nashua, New Hampshire.  
 Gloucester, Massachusetts.  
 Woods Hole, Massachusetts.  
 Cape Vincent, New York.  
 Steamer *Fish Hawk* (Delaware River).  
 Battery Station, Maryland.  
 Fish Lakes, Washington, D. C.  
 Central Station, Washington, D. C.  
 Bryan Point, Maryland.  
 Edenton, North Carolina.  
 Wytheville, Virginia.  
 Erwin, Tennessee.  
 Put-in Bay, Ohio.  
 Northville, Michigan.

Detroit, Michigan.  
 Alpena, Michigan.  
 Sault Ste. Marie, Michigan.  
 Duluth, Minnesota.  
 Quincy, Illinois.  
 Manchester, Iowa.  
 Neosho, Missouri.  
 San Marcos, Texas.  
 Leadville, Colorado.  
 Spearfish, South Dakota.  
 Bozeman, Montana.  
 Baird, California.  
 Battle Creek, California.  
 Clackamas, Oregon.  
 Rogue River, Oregon.  
 Little White Salmon, Washington.  
 Baker Lake, Washington.

#### RESULTS OF FISH-CULTURE.

From correspondents in various sections of the country letters have been received from time to time showing the results of plants of brook trout, steelhead trout, rainbow trout, black bass, and crappie. The superintendent of Leadville station received numerous letters from individuals whose lakes had been stocked with brook trout and who, as a result, were engaged in fish-culture from a commercial standpoint. As illustrative of the scale upon which this work is being conducted in Colorado, 4,800,000 brook-trout eggs were collected by the superintendent during the past fall, all except about 250,000 being taken there from private lakes. The correspondence also shows that the brook trout is well established in public waters in various sections of the State, and this is of especial interest in view of the fact that there were no brook trout in the waters of Colorado a few years ago.

From Montana numerous letters have also been received from persons to whom fish had been furnished, and they all show the brook trout to be well adapted for the streams in that State. Mr. W. C. Gilmer, under date of March 24, 1900, reports the capture of a brook trout weighing  $2\frac{1}{2}$  pounds, dressed, resulting from a plant made in August, 1897, in a stream tributary to the Madison River, near Ennis.

There is no doubt as to the success of the steelhead trout in some

of the streams and lakes of eastern Montana. During the spring of 1900 over 50,000 eggs were collected from fish taken in Bridger Creek, and Mr. J. A. Davies, of Butte, Mont., reports that steelheads from 9 to 12 inches long were taken from a mountain lake in Madison County which had been stocked the previous year.

A member of the Catlin Land and Live-stock Company, near White Sulphur Springs, Meagher County, writes as follows:

The 5,000 steelhead trout sent us in October, 1898, were put in our spring creek, grown up with watercress and containing a good supply of snails, water-bugs, and worms. This creek empties into a reservoir of 5 or 6 acres, 6 to 8 feet deep, from which we have caught several varying in length from 9 to 12 inches. The flesh is pink or salmon-colored, and of good quality.

As these fish were only a year old when caught, it would seem that they are admirably adapted to the waters of that section.

Henry Gilmer, of Lewisburg, W. Va., under date of June 19, reports the capture of a rainbow trout weighing a pound in Howard Creek, near Lewisburg, which stream was stocked by the Commission in 1898. Mr. A. H. Gibboney, of Marion, Va., captured a rainbow trout 23 inches long, weighing 4 pounds 9 ounces, in Staley Creek, in August, 1900, and he reports that several hundred have been captured by Dr. Z. V. Sherrell, of the same place, since April 15, some measuring 14 to 23 inches in length, and one weighing 3½ pounds.

It has been the general impression that rainbow trout will not thrive in New England waters, but Hon. H. O. Stanley, of the Maine Fish Commission, under date of June 26, 1900, reports that a large number of these fish entered the trap of the State hatchery at Lake Auburn the previous spring and that eggs were collected from them. They weighed from 6 to 9 pounds, and were supposed to have escaped into Lake Auburn from the State hatchery several years ago, when it had been supplied with eggs by the U. S. Fish Commission.

Mr. J. D. Patton, of Cleveland, Tenn., states that rainbow trout are found in Jack River and Mitchell Creek as a result of plants made in those waters. Mr. William G. De Witt, of the Adirondack League Club of New York, forwarded two specimens of Swiss trout on July 29, 1900, taken in a lake controlled by the club, which had been stocked with a consignment furnished by this Commission.

Reports have reached the Commission from time to time of the capture of quinnat salmon in Lake Ontario and its tributaries. During the past year two specimens have been secured and identified by Mr. Livingston Stone, superintendent of the Cape Vincent Station, one of which was ripe and weighed 12½ pounds, the capture being made near Tibbetts Point light-house in a sturgeon net.

Several years ago the Commission liberated in the tributaries of the Potomac River 200 crappie and 200 large-mouthed black bass, and as a consequence, from January 1 to August, 1900 (excluding April and May), 47,795 pounds of bass were sold in Washington from the Potomac



River. The crappie (an excellent food-fish), though not handled in large numbers in the markets, is also very abundant.

Mr. C. N. Ironsides, of New York, under date of January 10, writes:

Some four or five years ago, at my request, your Commission sent me 100 crappie to be planted in York Lake, Sullivan County. It gives me great pleasure to report to you that the planting was entirely successful. Ninety-eight were placed in the lake, and the catch last summer and fall was very large. The lake is now well stocked with crappie.

#### SPECIAL INVESTIGATIONS AND INSPECTIONS.

During December, at the request of the Fish and Game Association of the District of Columbia, arrangements were made to seine the Chesapeake and Ohio Canal just after the drawing down of the water for the winter, with the view to transferring the fishes remaining in the pools to the Potomac River. This work was directed by Mr. L. G. Harron, who between December 14 and 22 removed all the fish in the canal from Middlekauff's Mill to Great Falls, a distance of 92 miles. Over 4,000 small-mouthed black bass were saved, 410 rock bass, 610 crappie, 700 white perch, 3,800 sun-fish, and 3,400 cat-fish, besides 70,000 or 80,000 of the commoner varieties. Nearly 500 carp, weighing from  $1\frac{1}{2}$  pounds to 15 pounds, were also captured, but no small ones were seen, and it is supposed they had been eaten by bass and other fishes.

At the request of Mr. Moreton Frewen, of Innishannon, Ireland, arrangements were made in May to forward a consignment of shad eggs to Queenstown with the view to stocking some of the rivers of Ireland with this valuable food-fish. On May 15, Mr. J. F. Ellis, superintendent of the car and messenger service, delivered on board the *Oceanic*, of the White Star Line, 700,000 eggs which had been furnished from the steamer *Fish Hawk*. They were placed in the refrigerator and arrangements were made with the steward to have the temperature kept between  $51^{\circ}$  and  $55^{\circ}$ . It is to be regretted that on the arrival of the vessel at Queenstown the eggs were all dead. It is believed that, if an experienced messenger were sent, shad fry, and possibly eggs, could be successfully transported, as the vessels take only about  $4\frac{1}{2}$  days to make the trip and there would be no difficulty in obtaining fresh supplies of water and ice en route.

In August the Fish Commission stations at Wytheville, Va., and Erwin, Tenn., were inspected by the assistant in charge of the Division of Fish Culture. The construction work accomplished at Wytheville during the past year was excellent, but in order to make the station efficient it will be necessary to build additional bass ponds and make a number of improvements, which, it was estimated, will cost about \$2,500. At the Erwin station the pond system for the propagation of trout was practically completed, but the grounds were in an unfinished condition owing to lack of funds, and it is estimated that it will require about \$500 to put them in good shape. The Crow

tract, lying due south of the present site and containing about 40 acres, on which the Commission had secured an option with the view to purchase, was carefully examined, and it was recommended that it be devoted entirely to the propagation of bass and crappie, the ponds to be supplied with water from Indian Creek or the stream running through the station grounds. It is recommended that an appropriation of \$5,000 be obtained for this purpose.

Between November 16 and 23 the stations at St. Johnsbury, Nashua, East Orland, Green Lake, and Woods Hole were inspected and conferences held with the various superintendents with reference to the conduct of fish-cultural work. The St. Johnsbury station had been materially improved by the construction of additional rearing-ponds, but the water supply was still inadequate. Plans for the construction of a large reservoir were under consideration, and an estimate of the cost will be submitted with the view to obtaining a special appropriation. The collection of trout eggs, which had just been completed, was very unsatisfactory, owing to the drought which was then prevailing throughout New England and which had caused the destruction of thousands of adult fish by the drying up of streams.

Owing to the incomplete condition of the Nashua Station and to the fact that the superintendent had had no opportunity to establish auxiliary stations, very little fish-cultural work had been done at that point. A few thousand eggs had been collected at Dublin Pond, and it was decided to purchase from commercial hatcheries a sufficient number for supplying applicants in the State. A number of rearing and brood ponds had been completed, but after a careful examination of the station it was decided that it would require from \$5,000 to \$6,000 to put the station in thorough working order.

The spawning season of the Atlantic salmon at Craig Brook closed on November 20, two days before the assistant's visit. Although the number of fish purchased for this work was larger than in past years, on account of their smaller size the output was less. The land-locked salmon work at Grand Lake Stream was unfavorably affected by the drought. The grounds and buildings at this station were in fair condition and the work was in general satisfactory.

At Green Lake egg collections were still in progress, but the indications here, as at other stations, pointed to a shortage on account of the excessive drought. In many lakes the water was so low that salmon and trout could not enter the streams to deposit their eggs.

As the water supply has not been satisfactory for rearing trout, the superintendent submitted a plan for increasing and improving the supply by raising the dam at Rocky Pond. The suggestion seemed practicable, and it was recommended that a special appropriation be asked for this purpose.

At the time of the assistant's visit to Woods Hole there were on hand over 2,000 brood cod, weighing 6 to 20 pounds, which had been captured by the *Grampus* and placed in live-boxes at the station. The

question of opening the Plymouth and Kittery Point auxiliary stations was thoroughly canvassed with Capt. E. E. Hahn and arrangements made to commence work in November. The steam launch *Blue Wing* was then being overhauled and put in readiness for the work. The buildings and grounds had been much improved during the year, but the wharf was incomplete owing to lack of funds. An additional appropriation of \$2,000 was recommended for this purpose.

Late in November, at the request of the superintendent of the Northville station, the assistant in charge visited the Detroit hatchery and the three white-fish fisheries which were then in operation on Belle and Grassy islands. The hatchery at that time contained about 500 jars of eggs, and 15,000 adult white-fish were held in pens on the islands. As it appeared that the hatchery would be overcrowded, arrangements were made with the Michigan Fish Commission for the utilization of the Sault Sainte Marie hatchery, and Alpena was reopened. On the return trip from Detroit a stop was made at Monroe Piers, where the superintendent of the Put-in Bay station met the assistant with the steamer *Shearwater* and took him to the station. The work at Monroe Piers was well organized under direction of Mr. J. C. Fox, the foreman. The crates contained about 10,000 fish. At Put-in Bay there were over 100,000,000 eggs in the hatchery, besides 27,000,000 which had been shipped to Cape Vincent. There were also four or five thousand fish in the crate, and it looked as though from 240,000,000 to 250,000,000 white-fish eggs would be obtained.

The Edenton station was visited in December for the purpose of conferring with the superintendent with reference to the sinking of artesian wells for supplying the bass ponds. The appearance of this station as approached from Edenton is exceedingly attractive, and especially the hatchery, which is not only one of the most artistic ever put up by the Commission, but is also well adapted for the purpose for which it was built.

During the spring months the shad stations on the Potomac, Susquehanna, and Delaware rivers were visited from time to time for the purpose of conferring with the superintendents with reference to the proper conduct of the work. Inspections were also made of the lobster work in progress at Woods Hole and Gloucester, and a careful examination was made, in company with the superintendent, Mr. C. G. Atkins, of the auxiliary station for collecting Atlantic salmon at the headwaters of the Penobscot at Mattagamon. The rack was then being constructed, and it was thought a considerable number of salmon would be secured. En route from Bangor a stop was made at Cape Vincent, as this station had not been inspected for several years. It is very attractive and well equipped throughout. The fish-cultural work was about to close, the pike-perch and brook-trout fry having all been hatched and partly distributed. A conference was held with the superintendent relative to the pike-perch work at Swanton and the taking up of the sturgeon work on Lake Champlain.

## STATION REPORTS.

## GREEN LAKE STATION, MAINE (E. E. RACE, SUPERINTENDENT).

As the water in Green Lake has been very low for several summers, and particularly low during the past season, it became necessary to construct a floating wharf at Mann Brook as a landing. A scow 26 feet long was also built for transporting fish from the station to the railroad station at Green Lake, the spawning-house which had been used at Great Brook was removed to the station and fitted up as a residence for one of the laborers, and the old hatchery building, which had been removed from the head of the lake to the station in 1898, was remodeled and fitted up as a cottage. A large amount of miscellaneous work was also accomplished by the station force, including repairs to the hatchery, ponds, foreman's residence, and the steamer *Senator*.

The fish on hand at the beginning of the year are shown by the following table:

| Species.               | Calendar year in which hatched. |        |       |       |
|------------------------|---------------------------------|--------|-------|-------|
|                        | 1899.                           | 1898.  | 1897. | 1896. |
| Landlocked salmon..... | 311, 123                        | 397    |       | 277   |
| Steelhead trout.....   |                                 | 5, 126 | 500   |       |
| Brook trout.....       |                                 | 829    |       |       |

The young landlocked salmon were carried through the summer in troughs and ponds with remarkable success; the distribution made during August and September amounted to 309,274, showing a loss of 1,849, or less than 0.5 per cent of the number on hand at the beginning of the year. These fish were fed chiefly on beef liver, purchased in Bangor and shipped to the station by express three times a week. When the landlocked salmon of 1898 were again counted in November there were found to be 301, of which 176 were albinos; 50 were furnished in February to the Boston Sportsmen's Association, and at the end of the year only 24 of the lot remained. Of those hatched in 1896 but one was lost during the year. They were held in the south reservoir and made a fine growth, measuring from 12 to 14 inches in length. It is hoped that they will yield eggs next season.

The brook trout retained from the hatch of 1898 are held in one of the small ponds at the rear of the hatchery, and though apparently healthy, they have grown very slowly. During the summer 349 of them died on account of the high temperature of the water.

The two lots of steelhead trout resulting from eggs hatched in 1897 and 1898 have done very well since they were transferred from the shallow ponds to the reservoir, where there is a considerable depth of water; of the younger lot 3,653 were liberated in Rocky Pond in November, and at the close of the year there were on hand 493 of the hatch of 1897 and 1,368 of the hatch of 1898. They were examined in April and the males were found to be well developed, about 75 per

cent of them being ripe, though no ripe females were found. It is expected that they will produce quite a number of eggs next season.

Early in September arrangements were made for the collection of brook-trout, lake-trout, landlocked-salmon, and golden-trout eggs at the various field stations operated in previous years. The outlook was very discouraging, on account of the protracted drought, the water in all the surrounding ponds and streams being very low.

The following table shows the field stations operated, number of fish captured, and yield of eggs from the various sources:

| Stations.              | Species.                | Males. | Females. | Total. | Yield of eggs. |
|------------------------|-------------------------|--------|----------|--------|----------------|
| Winkempaugh Brook..... | Brook trout.....        | 34     | 71       | 105    | 109,500        |
| Do.....                | Landlocked salmon.....  | 38     | 54       | 92     | 191,000        |
| Patton Pond.....       | Brook trout.....        | 78     | 60       | 138    | 116,000        |
| Do.....                | Landlocked salmon.....  | 2      | 2        | 2      |                |
| Flood Pond.....        | Brook trout.....        | 49     | 11       | 60     | 12,500         |
| Do.....                | Golden trout.....       | 43     | 21       | 64     | 10,000         |
| Cold Stream Pond.....  | Lake trout (togue)..... | 457    | 511      | 968    | 750,000        |
| Do.....                | Landlocked salmon.....  | 37     | 36       | 73     | 60,000         |
| Green Lake.....        | Brook trout.....        | 4      | 8        | 12     | 13,000         |
| Do.....                | Landlocked salmon.....  | 47     | 48       | 95     | 93,000         |

The fish captured at the various auxiliary stations were liberated as soon as stripped, with no loss. The eggs collected at Winkempaugh, Flood Pond, and Patton Pond were transferred to the station as soon as fertilized, and arrived in fair condition, the losses averaging from 7 per cent to 14 per cent. Those from fish penned at Great Brook were delivered without loss. The eggs collected at Enfield were eyed at the State hatchery and then transferred, the lake-trout eggs arriving on November 28 and the salmon eggs in February.

The water supply at this station was very unsatisfactory throughout the winter. The temperature of the water dropped in November from 45° to 32½°, and it remained intensely cold until spring. This seriously retarded the development of the eggs, those of the brook trout being in the water 125 days and of the salmon 132 days before showing the eye-spots. These unfavorable conditions caused serious losses.

In addition to the eggs collected in Maine, 300,000 lake-trout eggs were received from Northville and 200,000 brook-trout eggs were purchased from dealers in Massachusetts. The latter arrived in excellent condition, the entire loss on the 200,000 being about 13 per cent. Of the lake-trout eggs collected at Cold Stream Pond, 350,000 were turned over to the State of Maine.

The fry commenced hatching early in March, and in April and May 587,000 lake-trout, 323,644 brook-trout, and 6,990 golden-trout fry were distributed. At the close of the year the following were on hand:

| Species.               | Calendar year in which fish were hatched. |       |       |       |
|------------------------|---|-------|-------|-------|
|                        | 1900.                                     | 1898. | 1897. | 1896. |
| Landlocked salmon..... | 183,077                                   | 149   |       | 270   |
| Steelhead trout.....   |   | 1,368 | 493   |       |
| Brook trout.....       |   | 448   |       |       |





above Medway, where the east and west branches unite, about 150 miles above Bucksport, and  $7\frac{1}{2}$  miles from Staceyville, on the Bangor and Aroostook Railroad. The temporary camp and works are located on the west side of the river at the entrance to a cove known as "Hunt Logan," formed by an ancient river bed from which the stream has by natural causes been partially diverted, though the connection between the old bed and the new is still maintained.

After careful consideration it was estimated that about 200 salmon had passed over the dams to the upper waters of the Penobscot and spawned the previous summer, but the nests are scattered over about 50 miles of stream, and unless the fish can be captured and held at one point it would be impossible to collect any considerable number of eggs. It was therefore necessary to select a site where all the fish ascending the stream could be captured and held until September or October, and for this reason "Hunt Logan" was selected. By means of a weir across the river, it is proposed to turn all the fish into the mouth of the "Logan" and then into a trap without any handling whatever. The problem of constructing a weir that would give passage to boats and logs, which are floated down past this point in July, and still maintain itself and its efficiency without interrupting the work, has been a very difficult one, but an attempt will be made to meet it in the following manner: A leader will be run diagonally across the river, with pounds for entrapping the salmon at the upper or western end, and from these pounds the fish will be admitted to the inclosure in the "Logan." The pounds will be made by driving stakes in the bottom, but the leader which spans the river will consist of a series of small peeled, seasoned, and buoyant poles, anchored by attaching one end to a heavy chain cable, about 1 foot apart, and allowing the other end to swing free in the current, which will permit them to rise aslant to the surface and keep them swaying constantly to and fro. This weir is now in course of preparation.

During the months of May and June 212 adult salmon were purchased at the mouth of the river and impounded at Dead Brook, so that in the event of failure at the head of the river it will still be possible to collect a fair number of eggs.

The landlocked salmon on hand at the beginning of the year at Craig Brook and Grand Lake Stream were carried through the summer with slight losses, and during the fall months 70,836 were distributed from Craig Brook and 111,787 from Grand Lake Stream. The loss at the latter point during the summer amounted to 18,799, most of which probably escaped through the foot screens in the troughs into Grand Lake Stream.

The trap for the capture of adult salmon was completed on October 28, and fishing commenced immediately and continued uninterruptedly until November 20. The water in the stream was unusually low, but the fish commenced running in large numbers and 541 had been penned by November 3. The run stopped abruptly at this time, and though

operations continued for over two weeks the total catch amounted to only 371 females and 256 males. Of the females 24 proved barren; the others yielded 242,559 eggs, of which 182,300 were eyed and half of them transferred to Craig Brook. The balance were held at Grand Lake Stream and hatched. The fry did well until June 27, when they were suddenly attacked by an epidemic which carried off a third of them in three days, so that 53,715 remain at the close of the year. Of those transferred to Craig Brook 75,000 were shipped to State fish commissions and private applicants; the balance were hatched, producing 15,944 fry. Of these, 10,000 were distributed in the spring and 5,092 remain at the close of the year.

In one of the deep ponds 166 steelhead trout have been held for several years for experimental purposes, and from these 42,000 eggs were collected during the spring of 1900. They were of very poor quality, however, and only 33,275 fry were hatched from them. Of these, 9,000 were distributed and there are on hand 21,092.

During the spring of 1897 a number of adult rainbow trout were turned loose in Alamoosook Lake. The following spring and each spring thereafter, though in decreased numbers, the survivors of the fish have entered Craig Brook to spawn. Some eggs have been taken from them each season, but mostly of poor quality. During the past spring 12,600 eggs were obtained from this source.

The two adult broods of Scotch sea trout on hand are the result of eggs imported from Scotland in 1891, the oldest brood being the result of the eggs imported, and the other their first descendants. Eggs were collected from both broods this spring, and though not of first-class quality they were no worse than the average eggs from domesticated fish. In fact this species stands at the head of all the *Salmonidæ* reared at Craig Brook for vigor and hardiness in the face of unfavorable influences. Of the 144,145 eggs collected 10,000 were shipped, and the balance were hatched at the station, producing 98,575 fry; 35,000 were liberated in May, and on June 30 there remained on hand 6,416.

The food consumed at this station during the year was as follows: 3,574 pounds of beef liver, 22,234 pounds of hogs' plucks, and 8,560 pounds of horse flesh, in all 34,368 pounds, costing \$449.57, in addition to \$56.04 for freight, \$71.26 for drayage, and \$37.80 for ice and its preservation, making the total cost of fish food for the year \$614.67.

Following are the fish on hand at the close of the fiscal year:

| Kind.                   | Calendar year in which fish were hatched. |       |       |       |       |                  | Wild fish in-closed. |
|-------------------------|---|-------|-------|-------|-------|------------------|----------------------|
|                         | 1900.                                     | 1899. | 1898. | 1897. | 1896. | 1895 or earlier. |                      |
| Atlantic salmon .....   | 194,572                                   | 523   |       |       |       |                  | 210                  |
| Quinnat salmon .....    |   |       |       | 78    |       |                  |                      |
| Landlocked salmon ..... | 58,807                                    | 984   | 803   |       |       |                  |                      |
| Scotch sea trout .....  | 6,416                                     | 273   |       |       |       | 218              |                      |
| Steelhead trout .....   | 21,092                                    | 974   |       |       | 165   |                  |                      |
| Brook trout .....       | 211                                       | 283   |       |       |       |                  |                      |
| Rainbow trout .....     | 4,464                                     | 299   |       |       |       |                  |                      |
| Total .....             | 285,562                                   | 3,336 | 803   | 78    | 165   | 218              | 210                  |

ST. JOHNSBURY STATION, VERMONT (J. W. TITCOMB, SUPERINTENDENT).

The fish on hand at the beginning of the year were as follows:

| Species.   | Calendar year in which fish were hatched. |       |       |       |       |
|--|---|-------|-------|-------|-------|
|  | 1899.                                     | 1898. | 1897. | 1896. | 1895. |
| Rainbow trout .....  | 310                                       |       |       | 310   |       |
| Steelhead trout .....                                      | 4,335                                     | 67    |       |       | 26    |
| Brook trout .....  | 7,665                                     |       |       |       |       |
| Landlocked salmon .....                                    | 42,329                                    |       |       |       |       |
| Hybrids (female brook trout crossed with lake trout) ..... | 2,241                                     |       |       |       |       |
| Grayling .....   | 8,000                                     |       |       |       |       |
| Total .....  | 64,880                                    | 67    |       | 310   | 26    |

The rainbow-trout fry on hand on July 1 were obtained from fish hatched at the station in 1896, but only 77 of them lived to the close of the year. From the 256 adults available in the spring 58,574 eggs were taken, but many of them were shotty and hard, so that only 48,740 were placed in the troughs; and though these appeared to be of good quality, only 6,000 of the fry hatched from them survived to the close of the year. These are apparently strong and healthy. The first eggs taken were laid down in cold water in the hatchery; later on troughs were set up at the source of a spring and these eggs were transferred to them, as well as all eggs subsequently taken, and it was found that the eggs which had been carried in cold water for a few weeks eyed about as well as the others, though most of them burst before hatching. It is estimated that only 10,000 of the total take were actually fertilized.

Of the 4,335 steelhead-trout fry on hand at the beginning of the year, 3,340 were reared to the fingerling stage and 2,200 of them were planted. The others were retained for domestication, but by the last of the year their number had been reduced to 348. As the pond in which they were held during the winter was covered with ice 2 feet thick, it is impossible to assign any reason for so large a loss.

Of the 7,665 brook-trout fry on hand at the first of the year, 6,310 were distributed as fingerlings and the balance retained; 470 of them survived the winter.

The landlocked salmon suffered extremely during the hot summer months, and in the fall only 17,260 remained for distribution. In order to keep landlocked salmon in a healthy condition it is necessary to salt them thoroughly at least three times a week.

The hybrid trout obtained by crossing the *fontinalis* with the *namay-cush* were carried without difficulty for several weeks, when 100 were delivered to Prof. W. J. Moenkhaus, of Harvard College, and 1,859 were planted in Caspian Lake.

The 8,000 grayling fry resulting from a shipment of eggs from Bozeman dwindled rapidly after the absorption of the sac, but the few strong ones among them took food readily and made a more rapid growth than any other variety of fish ever hatched and reared at this

station. Another peculiarity in connection with them was the remarkable variation in the size of the fingerlings. They were fed on an emulsion of liver, obtained by grinding it as fine as possible, straining, then mixing with water and allowing it to stand for the coarser portions to settle. The liquid portion of the food thus obtained was fed to the grayling and the settlings utilized as food for the trout fry. At the close of the year 73 of this lot remained.

During the summer and fall field collecting stations were established at Darling Pond, Groton; Lake Mitchell, Sharon; Lake Dunmore at Salisbury, Big and Little Ponds in Averill, and also at the State hatchery, Roxbury.

Darling Pond, where operations have been successfully conducted for several years, changed ownership recently, and a contract was made with the present owners whereby they are to receive one half the eggs taken there and the Fish Commission the other half. The trap was put in place on July 25, but at that time the stream feeding the pond was nearly dry on account of the long-continued drought. The catch of fish was far below that of any previous season, and many that were taken in nets below the trap appeared to be clearing off spawning-beds. The total number of eggs secured was 390,828, of which 172,828 were lost in incubation. Half the balance were turned over to the owners of the lake and the remainder were shipped to St. Johnsbury. Besides reducing the catch, the drought tended to impair the quality of the eggs secured. Its effects were very noticeable on the spawning fish, whether detained in pens or having free range. Trout will not spawn naturally when the water is low. A few stragglers ascend the stream, and if caught and retained in the pens they will ripen in time, but the percentage of eggs saved is never large. The majority of the fish swim around the mouths of the streams awaiting an opportunity to ascend on a rise of water. If a sudden rain falls and causes even a temporary rise it will start them, and apparently has an immediate effect upon the eggs and milt.

At the field stations, for rough measurement, an 8-ounce tin dipper is used, it being necessary to establish a measure for each stripping, owing to the great variation in the size of the eggs. The largest ones are obtained at the first stripping and the smallest at the last. At Darling Pond the first stripping yielded 2,800 eggs to the ounce and the last 4,500, the intermediate ten strippings varying between these two measures, the number per ounce becoming greater at each consecutive stripping.

The work at Lake Mitchell was very satisfactory and more eggs were taken than in any previous season, notwithstanding the excessive drought. The good results of stocking this lake were very apparent this year in the largely increased take of fish, 3,136 being captured, 1,691 being females. During the season 726,649 eggs were obtained from 1,339 females; 355,649 died during incubation or were not fertilized, and the remaining 371,000 were transferred to St. Johnsbury.

It was noticed that the number of females exceeded the number of males, and to such an extent at times that it became impossible to secure an adequate amount of milt. At Quimby mill-pond, 4,000 eggs were fertilized with milt taken at Lake Mitchell (about 2 miles distant) several hours earlier. On November 24 the traps and racks were removed and the fish liberated. It was then found that most of the males were ripe, just twenty-five days after the last female had been stripped. This peculiarity was attributed to the drought.

Lake Dunmore is in the town of Salisbury and has an area of about 3,000 acres, one-half of which is suitable for lake trout and bass. The other half is shallow and is inhabited by pickerel and other coarse varieties. An examination of the spawning-grounds in 1898 seemed to indicate that a large number of lake-trout eggs could be secured, consequently on October 16 a field station was established and a careful watch of the spawning-beds was kept. A camp was started, troughs set up and connected with a spring, and a trap was set near the spawning-grounds off White Rocks. No fish were caught and the position of the net was changed, but with no better success. On the 25th of October 208 lake trout were captured by using a 200-foot gill net as a seine off Birch Point, about a half mile from White Rocks, the catch being made between 8 p. m. and 5 a. m. As soon as it was discovered that they could be taken in apparatus of this character a 40-rod seine was used and 761 were captured by the 14th of November, 639 being males. Of the females 102 were ripe and yielded 212,000 eggs. The fish averaged  $3\frac{1}{2}$  pounds in weight, though the largest weighed nearly 15 pounds. Difficulty was also experienced here in securing milt, in one instance over 100 males being handled in order to obtain enough to fertilize the eggs from 12 females. Only about 84.5 per cent of the eggs taken were successfully eyed. The station was closed on December 20 and the eggs transferred.

A field station was established at the Averill ponds, principally for the collection of golden trout (*aureolus*) and incidentally for brook trout, both species being abundant there, but no ripe fish of either species were captured, though an assistant was kept at the ponds throughout the spawning season.

Arrangements were made with the State Commission to collect at Roxbury, and as a result 340,000 eyed eggs were secured.

The total collections of eyed eggs transferred from all points to St. Johnsbury amounted to 820,000 of the brook trout and 212,000 of the lake trout. In addition to these, 30,000 rainbow-trout eggs were transferred from Manchester, 40,000 landlocked-salmon eggs from Maine stations, 55,000 steelhead-trout eggs from Clackamas, and 72,000 grayling eggs from Bozeman, all arriving in excellent condition except the rainbows. These came in two lots and were transferred from a temperature of 42° to 33°. The losses on both lots occurred chiefly about a month after their receipt and just as they commenced to hatch, only about 800 fry resulting from the two consignments.

During December and January 314,000 brook-trout eggs were shipped to State fish commissions and private applicants, including one shipment to Scotland. The lake-trout fry hatched in March and April, producing 180,000, which were distributed in suitable waters in Vermont, Connecticut, and Massachusetts. The distribution of the brook trout commenced in April and was completed the last of June, 534,100 being distributed during that period by employees of the station.

At the close of the year there were on hand the following:

| Species.                          | Calendar year in which fish were hatched. |       |       |       |       |
|-----------------------------------|---|-------|-------|-------|-------|
|                                   | 1900.                                     | 1899. | 1898. | 1896. | 1895. |
| Rainbow trout .....               | 5,411                                     | 77    |       | 245   |       |
| Steelhead trout .....             | 23,981                                    | 348   | 39    |       | 9     |
| Brook trout .....                 | 16,018                                    | 470   |       |       |       |
| Hybrid brook and lake trout ..... |   | 13    |       |       |       |
| Grayling .....                    | 3,550                                     | 73    |       |       |       |
| Landlocked salmon .....           | 30,914                                    |       |       |       |       |
| Total .....                       | 79,874                                    | 981   | 39    | 245   | 9     |

It has been found here that brook trout thrive best in a temperature ranging from 55° to 60° and grayling in a temperature from 65° to 70°. Both grayling and trout have been tested in temperatures ranging from 48° to 70° during the last two months of the year, and from the observations it has been possible to make with the varying conditions it is believed that landlocked salmon, steelheads, and rainbow trout all do best in temperatures most favorable to the brook trout, while grayling thrive best in water somewhat warmer. One trough of grayling kept in spring water at 48° (the same in which they were hatched) did not take food readily and nearly all of them died. While the landlocked salmon have endured the highest temperature of any variety tested, they do not take food readily in water above 70°.

#### NASHUA STATION, NEW HAMPSHIRE (W. F. HUBBARD, SUPERINTENDENT).

On July 1 the personnel provided for by Congress, consisting of a superintendent, a fish-culturist, and two laborers, was appointed. The superintendent relieved Mr. W. F. Page, who had been in charge of the construction work, on July 12.

During the summer, with the assistance of a temporary force, considerable work was done on the grounds and ponds. All of the ponds were dried, the mud removed, and the bottoms covered with sand. Eleven wells were driven on the south side of the hatchery building to furnish water. These are of 2-inch iron pipe, driven from 14 to 20 feet deep, and when completed, in August, they furnished 192 gallons of water per minute, or an average of 17½ gallons per well. The wells discharge into a wooden flume on the outside of the building, which connects with the hatching-troughs by means of iron pipes through the sides. The grounds around the hatchery and the walks between the ponds were graded and sown with grass, and various other minor improvements were made.



In September the adult trout, numbering 114, were transferred from the stock pond to one of the smaller ponds, where they could be more easily handled during the spawning season. The first eggs were collected on October 20 and the last on November 29. An auxiliary station for the collection of eggs of the native brook trout was also established at Dublin Pond, New Hampshire; but only a small number of eggs were secured, and at the close of operations there the 240 adult fish that had been stripped were transferred to ponds at the station.

Owing to the unprecedented drought prevailing all through New England, the water supply from the wells was seriously affected in the fall and it became necessary to use water from the western reservoir.

In January 350,000 brook-trout eggs were received from the New Hampshire commissioners to be hatched at the station, and the fry resulting were returned to them in May and June. In February 358,000 brook-trout eggs were purchased from Mr. L. B. Handy, of South Wareham, Mass., but they proved to be of very poor quality and produced only 223,750 fry. Of these 113,000 were distributed in May and June to applicants in Massachusetts, New Hampshire, and Rhode Island, together with 284,630 lake-trout fry resulting from a shipment of 300,000 eggs received from Duluth in March. On the 11th of May 50,000 grayling eggs arrived from Bozeman in excellent condition, and were hatched without any appreciable loss, though quite a loss occurred just after the absorption of the sac. They were transferred at this time from troughs in the hatchery, where the temperature of the water was 48°, to some of the outside troughs, where the water temperature was 60°. After that there was comparatively no loss; and on June 30 there were 29,785 fingerlings on hand.

The superintendent received from the New Hampshire Commission a large number of adult lake trout, landlocked salmon, and golden trout, which were held in the ponds from November until February for the Boston Sportsmen's Association.

A contract for the construction of the superintendent's cottage was made in December, and by May 31 the building was completed. It is a frame building 30 by 38 feet with cellar. The first floor consists of a hall, parlor, dining room, pantry, and kitchen, with four bedrooms and a bathroom on the second floor, and an attic extending over the entire house above.

The following table shows the number of fish and fry on hand at the close of the year:

| Species.               | 1896. | 1897. | 1898. | 1899. | 1900.   |
|------------------------|-------|-------|-------|-------|---------|
| Brook trout.....       | 104   | * 198 | 68    | ----- | 128,530 |
| Steelhead trout.....   | ----- | ----- | ----- | 266   | -----   |
| Rainbow trout.....     | ----- | ----- | 77    | ----- | -----   |
| Landlocked salmon..... | ----- | ----- | 92    | ----- | -----   |
| Grayling.....          | ----- | ----- | ----- | ----- | 29,785  |

\* Dublin pond trout.

## WOODS HOLE STATION, MASSACHUSETTS (E. F. LOCKE, SUPERINTENDENT).

In October the *Grampus* commenced the collection of brood-cod, as usual, and by November 18 had delivered at the station 2,200, varying in weight from 6 to 20 pounds; 152 were also purchased from one of the commercial fishermen, making a total of 2,352. These fish yielded 103,444,000 eggs. Of these 630 died from natural causes during the season and 1,311 barren and spent ones were tagged and released, and by the close of the year 11 of them had been reported captured between Chatham, Mass., and the New Jersey coast.

The Plymouth auxiliary station was opened in November under direction of Capt. E. E. Hahn, Mr. G. F. O. Hanson, mate of the *Grampus*, being placed in immediate charge of the work with a force of spawn-takers. The first eggs at that point were obtained on November 28, and by the 17th of February 71,275,000 had been transferred to Woods Hole, bringing the total for the season to 174,719,000. The quality of the eggs was excellent and the fry from them were apparently strong and healthy. As a result of the season's work 126,921,000 fry were liberated in Vineyard Sound, near Gay Head. It is recommended that this work be extended and that at least 3,500 brood cod be provided for next season.

As the experience of past years has shown that a majority of the flat-fish had spawned before the work was undertaken, arrangements were made this year, early in January, to set fyke nets in Woods Hole Harbor, but no fish were captured until the end of that month. On January 30 nets were also sent to Waquoit Bay, but could not be set until February 7 on account of the large amount of ice in the harbor. From these two fields 250 adults were secured, 29 of which died from natural causes before spawning. The spawning lasted from January 31 to April 18, during which time 102,381,000 eggs were secured, 47,069,000 being obtained from fish caught in Woods Hole Harbor and 55,312,000 from those caught at Waquoit Bay. It is worthy of remark that the Woods Hole fish yielded more eggs per fish than those from Waquoit, the average of the former being 475,000 per fish and of the latter 357,000. This is the reverse of the experience of past years.

As great difficulty had been experienced in the past two years in artificially fertilizing the eggs, the plan was adopted this year of holding the brood-fish in live-boxes and allowing them to spawn naturally. The results were very gratifying. But few unfertilized eggs were observed, and the output of fry was the largest in the history of the Commission, the plants in Waquoit Bay and Woods Hole Harbor amounting to 87,115,000.

Although every effort was made to enlarge the lobster work, the season was very discouraging. Early in April arrangements were made for collecting egg-lobsters at Plymouth and Scituate, and also from fishermen operating in Buzzards Bay and Vineyard Sound. Subsequently a sailing smack was employed to attend the pots in the

vicinity of Noank and Stonington, and Block Island and Newport. Early in May, when the majority of the lobsters are usually caught, the coast was swept by high easterly winds, causing heavy seas, which interfered materially with fishing operations. In addition to this, lobsters were scarcer than ever before in the history of the fishery, and in many localities operations were abandoned entirely and the fishermen engaged in other pursuits. This was particularly noticeable at Noank and Block Island. At the former place, where there are usually 40 fishermen, only 10 set pots, and even these discontinued work on June 9, on account of the poor results attained and loss of gear. At Block Island the conditions were even worse; where 15 or 20 men usually engaged in this fishery, only one set pots this year, and he abandoned them later to go cod-fishing. The same conditions existed to a certain extent at New Bedford, Buzzards Bay, and elsewhere. From New Bedford, which has been in the past one of the most productive fields, and which yielded last year 347 egg-lobsters, only 26 were secured. The season closed on June 27, the take amounting to 28,142,000 eggs, from which 22,463,000 fry were hatched and planted or turned over to Dr. H. C. Bumpus for experiment, with the view to feeding them in pens until after the fourth molting.

During the summer all of the buildings were painted inside and out, the old plumbing in the residence was replaced with new, and the whole system of water-pipes was overhauled. In many instances the old pipes, which had been in use for a number of years, were so badly corroded that more than three-fourths of the opening was closed. In the hatchery and laboratory a number of additional bedrooms were provided. Work on the wharf commenced in the fall, but it was not completed owing to lack of funds. The old boiler and engine in the launch *Blue Wing* were condemned and new machinery installed, the main boiler being also repaired and the old tubes removed. The engines in the launch *Cygnets* were also overhauled and repaired.

GLOUCESTER STATION, MASSACHUSETTS (C. G. CORLISS, SUPERINTENDENT).

Operations at this station were confined to cod and lobsters. During the summer no fish-cultural work was in progress, but the station force was fully occupied in making repairs to the buildings and getting the hatching apparatus ready for fall work. The old wharf, which had been practically destroyed by the storms of the previous winter, was removed and a new one 155 feet long by 16 feet wide, with a T at the outer end 42 feet by 16 feet, was constructed, in accordance with plans prepared by the architect of the Commission. As soon as it was finished the suction box, which extends from the hatchery to the end of the wharf, was replaced and the suction pipe laid into it, packed in sawdust to prevent its freezing in winter.

By November 15 the station was in thorough order, but no eggs were received until the latter part of the month, when Captain Hahn with the crew of the *Grampus* commenced collections at Kittery. At

the same time another force, under the direction of Mr. Hanson, began work at Plymouth, Mass. The first eggs were received at the station on November 28, and collections continued uninterruptedly until March 23, during which period 180,230,000 were obtained at Kittery and forwarded to Gloucester, besides 17,792,000 from Plymouth and 858,000 from local fishermen, making a total of 198,880,000 for the season.

The number of eggs collected was larger than usual, and of excellent quality, which was due to a large extent to the favorable weather throughout the winter. As a result of the season's work, 135,693,000 fry were hatched and planted along the Massachusetts coast from Rockport to Beverly, and 3,000,000 were deposited in the Chesapeake Bay as an experiment.

As soon as the last of the fry were distributed arrangements were made to commence the collection of egg lobsters. The *Grampus* proceeded early in April to the coast of Maine, and with the steam smack collected from all points between Portland and Eastport, shipping the lobsters to the station. Arrangements were also made—at Kittery, Cohasset, Boston, and all points in the vicinity of the station—with fishermen for holding their egg lobsters. By the middle of May the receipts from Massachusetts were very satisfactory and the prospects seemed good for a large season's work, but about this time the catch decreased steadily to the end of the season. On the Maine coast the season opened badly and the collections were smaller than usual, no lobsters being received from Nova Scotia. Between April 1 and the 10th of July 4,643 egg-bearing lobsters were purchased, which yielded 63,335,000 eggs.

The following table shows the number collected in the various localities and the yield of eggs from same:

| Locality.                                  | Egg lobsters. | Eggs.      |
|--|---------------|------------|
| Gloucester, Mass., and vicinity .....      | 555           | 7,813,000  |
| Boston, Mass., and vicinity .....          | 1,461         | 20,044,000 |
| Kittery Point, Me., and vicinity .....     | 683           | 9,687,000  |
| Maine coast, schooner <i>Grampus</i> ..... | 1,944         | 25,791,000 |
| Total .....                                | 4,643         | 63,335,000 |

Dr. H. C. Bumpus, at Woods Hole, was supplied with 1,300,000 eggs for experimental purposes. The balance yielded 58,560,000 fry, which were planted as shown in the table of distribution.

The lobster eggs shipped from Maine and other points arrived in much better condition than in the past, consequently the loss in hatching was small and the fry were strong and healthy. In accordance with an agreement made with the Maine Fish Commission the fry hatched from eggs collected on that coast were distributed in the waters of the State. They were shipped both by the schooner *Grampus* and by messenger and were planted in fine condition. The adults

were all liberated in the waters of the State from which they were obtained, care being taken to plant them well out at sea so that they would not be recaptured immediately.

As in previous seasons large numbers of dead lobster fry were sometimes found in the cans, special attention was paid to this matter on each trip, and on the completion of the work the messenger in charge reports that there was practically no loss. The new eggs made their appearance fully two weeks in advance of any previous year, which was attributed to the mild winter and to the fact that the water offshore during the winter and spring was several degrees warmer than has been the case for several years.

CAPE VINCENT STATION, NEW YORK (LIVINGSTON STONE, SUPERINTENDENT).

During July and August a part of the force was engaged at Swanton, Vt., in cleaning up the fishing-grounds preparatory to collecting pike perch there the following spring. Early in April operations were commenced on the Missisquoi River 3 miles below Swanton. A substantial shed 11 by 27 feet, with a platform 17 by 27 feet, was constructed on the river bank as a spawning-house, and three pens for holding fish were placed in the river near by. In the middle of the spawning-shed, and running lengthwise of it, a trough 12 feet long and 15 inches wide, divided into two compartments, was provided for holding ripe fish. This was supplied by a constant stream of water from tanks located on the platform. Fishing commenced April 14, but no ripe fish were found until the 22d, when they began coming on in large numbers, and from that time to the end of the month operations were pushed vigorously and large numbers captured, as many as 657 male pike perch being landed at one haul of a seine 22 rods long; 1,859 spawning fish were taken, which yielded 130,300,000 eggs, according to measurements made on the grounds, although when remeasured at the hatchery there were less than 116,000,000. Of these 85,225,000 were transferred to Cape Vincent and 30,500,000 were hatched at Swanton for distribution in Vermont waters, producing 12,600,000 fry, or about 41 per cent of the number of eggs retained. The fry were planted under the direction of the Vermont Fish Commission during June.

The hatchery is a small wooden building located near the Missisquoi River, in the town of Swanton. It was fitted with a battery of two tiers, containing 28 jars each, and a tank for the reception of the fry. The building was provided with heat and light and was leased at a small rental, the water supply being furnished by the village of Swanton at the rate of \$1 per day. It was very unsatisfactory, however, as it was filled with sediment washed down from the mountains in which the river rises, and though two men were kept busy night and day changing the filters and cleaning the jars, very heavy losses ensued. It is believed that under ordinary conditions a much larger percentage of fry would have been hatched.



The eggs forwarded to Cape Vincent were packed on cotton-flannel trays and sent in charge of a messenger. The first two shipments, forwarded on April 27 and 28, arrived in good condition, but the third and fourth, transferred on April 30 and May 1, turned out very badly, though there was no evidence to show that they were injured by transportation. They were probably of inferior quality. The eggs commenced hatching late in May and finished early in July, producing 25,400,000 fry, or a little over 30 per cent of the eggs received at Cape Vincent. The distribution was made with comparatively small losses in lakes and streams in western New York.

In October arrangements were made as usual for the collection of lake-trout eggs in Lake Ontario in the vicinity of Cape Vincent and in Lake Erie at Dunkirk, N. Y. The results at both places were unsatisfactory, only 47,800 being obtained from Lake Ontario and 126,000 from Dunkirk, although the spawn-takers remained on the collecting-grounds for nearly a month. The failure at both points was due to the fact that storms continued almost uninterruptedly during the fishing season, destroying nearly all of the nets. Early in December 2,000,000 lake-trout eggs arrived from Northville in excellent condition, and were hatched in the Stone salmon baskets placed in Williamson troughs, the losses being comparatively light. The fry, amounting to 1,875,800, were distributed in February and March, except a few thousand which were planted in May.

As there are no fields in the vicinity from which brook-trout eggs can be collected, arrangements were made to purchase a supply from dealers in New England, and during the early part of September 360,000 were obtained in this way. They were hatched in ordinary trout troughs, and the 280,500 fry resulting were planted in May and June, immediately after the absorption of the sac.

No attempt was made to collect white-fish eggs on Lake Ontario this year, as repeated efforts in that field in past years had proved fruitless; and as the collections on Lake Erie were larger than ever before in the history of the Commission, 34,560,000 eggs were transferred from Put-in Bay. They arrived in good condition, and 75 per cent were hatched in the McDonald jars. It is worthy of remark that during the distribution no white-fish fry died in the tanks or in the cans in transit. It seems extraordinary that in the process of handling and shipping so large a number not a single dead fish should have been found. A plant of 400,000 was made in Lake Champlain at the request of the Vermont Commission.

It was hoped that some effort would be made this year to continue the experimental sturgeon work undertaken the previous season, but lack of funds prevented. Through the efforts of Mr. Myron Green, a temporary employee, and several fishermen, however, over 70 sturgeon caught on the Missiquoi River were confined in pens and examined from time to time for ripe eggs. A few were found in one partly spent fish and were hatched at Swanton in the ordinary jars. A small



number of the fry produced were transferred to Cape Vincent. Much interest is manifested in this work, and it is hoped that some practical results may be secured next season.

The following table shows the number of eggs handled and the fry distributed during the year:

| Species.          | Eggs handled. | Fry distributed. |
|-------------------|---------------|------------------|
| Brook trout ..... | 360,000       | 280,500          |
| Lake trout .....  | 2,176,000     | 1,875,800        |
| White-fish .....  | 34,560,000    | 27,400,000       |
| Pike perch .....  | 85,225,000    | 38,000,000       |
| Total .....       | 122,321,000   | 67,553,300       |

STEAMER FISH HAWK (JAMES A. SMITH, COMMANDING).

On April 23 the vessel left Baltimore for the Delaware River, arriving there April 26. The crew were at once employed in getting the hatching apparatus in order, and arrangements were made with the fishermen to supply eggs on the same terms as heretofore, namely, \$10 per million. Mr. W. H. Johnson and G. L. Hopper were placed in charge of the hatchery and the crew were utilized as spawn-takers. The first eggs were collected on April 27, and collections continued uninterruptedly until the close of the season on May 31. During this period the work was most successful; 80,559,000 eggs were secured, from which 47,975,000 fry were hatched; 6,006,000 eggs were transferred to the Pennsylvania State Fish Commission hatchery at Bristol, and 8,332,000 were deposited on the spawning-grounds in Howell Cove and near Bennett's fishery, owing to the fact that the hatching facilities of the vessel were overcrowded. In addition to this 700,000 eggs were shipped to New York for transshipment to Ireland.

As in former seasons the Howell Cove fishery yielded the largest number of eggs, 36,194,000 being taken at that point, 16,035,000 from Bennett's Fishery, and 5,515,000 from Cramer Hill. The balance, 22,815,000, were collected from the gill-net fishermen off Billingsport, N. J. There is little doubt but that if funds had been available and the work could have been continued as heretofore until June 10, the collections would have reached 100,000,000.

The gill-net fishermen in the vicinity captured 7 Atlantic salmon, weighing from 10 to 15 pounds, during the season.

On June 4, the last of the fry having been planted, the hatching apparatus was dismantled and the vessel shortly after proceeded to Woods Hole.

BATTERY STATION, HAVRE DE GRACE, MD. (J. N. WISNER, JR., SUPT.).

On March 12 the superintendent opened the station with a force of six men and began fitting up the launches and placing the hatchery in condition for work. The mess-room, which had been much crowded in the past two years, was enlarged and repairs were made to the cottages occupied by the machinist in charge and the superintendent.

By April 15 the launches had been thoroughly overhauled and the hatching apparatus tested. The force was increased and vessels hired and stationed at various points to receive eggs from the fishermen.

The season was late, no eggs being collected until the 19th, on which date the water temperature registered 54°. As heretofore, arrangements had been made with all the gilliers fishing from Battery station, and within a radius of from 8 to 10 miles, to furnish eggs at the rate of \$20 per million, and 20 spawn-takers and assistants were employed for the purpose of attending the floats and doing other work.

The nightly collections were small (not exceeding 2,000,000) until April 26, when 4,900,000 were secured. They increased materially from that time, reaching a maximum of 16,332,000 on May 2. The season continued uninterruptedly until May 30, the total collections aggregating 167,582,000.

During the latter part of May ripe females were taken in large numbers, but male fish were very scarce. On one night 12,000,000 eggs were brought in, but the next day only 3,000,000 of them were found to be impregnated. On June 2 the water became so salt that operations were discontinued and the force dismissed. The season's work, though not as great as in the past two years, was exceedingly satisfactory. Of the eggs collected 17,711,000 were planted on the spawning-grounds in the vicinity of the station, as the hatchery was overcrowded; 12,040,000 were shipped to Central station, Washington, D. C., and to the Maryland Fish Commission in Baltimore, and 87,518,000 fry were hatched and planted in the Chesapeake Bay and its tributaries and in the Hudson River.

The following shows the number of eggs collected during April, May, and June, with the average temperature of air and water:

| Month.     | Eggs taken. | Average temperature. |         |
|------------|-------------|----------------------|---------|
|            |             | Air.                 | Water.  |
| April..... | 43,484,000  | ° F. 56              | ° F. 55 |
| May.....   | 122,093,000 | 63                   | 62.2    |
| June.....  | 2,005,000   | 72.3                 | 71      |
| Total..... | 167,582,000 | .....                | .....   |

On May 19 the temperature fell very suddenly from 70° to 64°, and on the following day it was noticed that many of the fry had bubbles of air in the sac. A large percentage of them exhibited this phenomenon in the next five days, the bubbles being easily discernible with the naked eye and so large as to cause the fry to float. This has been noticed before, but there are no data to show that it followed a sudden fall in temperature. Many theories might be advanced to cover this peculiar occurrence, but no definite conclusions have been reached.

During the spring 100,000 striped-bass eggs were received at the station, but as no apparatus had been prepared for hatching them,

the results secured were poor. A number of methods were tried and a few eggs hatched by each, and there seems to be no doubt that if many eggs were collected, apparatus could be devised for hatching them as successfully as the eggs of the shad. The eggs hatched in forty-four hours, and it was noticed that immediately after hatching the eye-spot could not be seen with the naked eye; but a small sac of oil was noticed at the head of the fish. Under the microscope the bubble of oil proved to be just under the head of the fish, apparently at its mouth. With a strong quarter-inch lens the pupil of the eye was discernible as a clear circle within another circle of greater density. The oil-sac gradually decreased in size, the eye becoming plainer until the third day, when it disappeared entirely and the eyes could be seen without the aid of the microscope. Attention is called to this, as the eye-spots of other fishes usually become visible about the middle of the period of incubation. It was proved that a large number of striped-bass fry may be retained a considerable length of time in a vessel of water without changing. This would indicate that they can be transported with great ease.

BRYAN POINT STATION, MARYLAND (L. G. HARRON, SUPERINTENDENT).

The station was opened on March 20 and a small force employed to make the necessary repairs and improvements preparatory for the coming season's work. The launch *Blue Wing* also arrived from Gloucester on that day and was utilized in carrying supplies and material from Washington and Alexandria to the station until the spawning season commenced, after which she was engaged in collecting eggs from the seines and gill nets. Spawning fish having been observed on April 15, the regular force was taken on the next day and active operations commenced. An additional steam launch was chartered for a month to assist in attending the gillers between Alexandria and Bryan Point and to carry supplies to the station.

Commencing April 17, eggs were collected each day until May 15, 67,904,000 being secured, all of which were hatched at the station, except 1,023,000 transferred to Central Station. Of the fry hatched (55,702,000, or 83 $\frac{1}{3}$  per cent of the eggs retained) 6,065,000 were delivered on board the Fish Commission cars at Alexandria for shipment to streams in South Carolina, Georgia, and Florida, and the balance planted in the Potomac between Broad and Occoquan creeks.

The outlook at the beginning of the season indicated a very large collection, over 49,000,000 eggs being taken between April 16 and 30, but in May the catch of fish declined so rapidly that all of the seine fishermen suspended operations and the gillers became indifferent on account of the small returns and would not fish regularly. Frequently no fishermen were operating on many of the important fishing-grounds. On May 19, all of the eggs being hatched and the fry planted, the *Blue Wing* was transferred to Gloucester, Mass., and on the 25th the station was closed and left in charge of a watchman.

## FISH LAKES, WASHINGTON, D. C. (RUDOLPH HESSEL, SUPERINTENDENT).

During the summer 43,844 black bass were removed from the breeding-ponds to retaining-tanks. Of these 32,967 were carried through the summer in the rearing-pools and distributed in October and November, when they varied in size from 3 to 6 inches. The large loss of young fish is attributed to some extent to their being held for several weeks in the retaining-tanks, at which time the water was constantly roiled. In one of the smaller ponds 200 small-mouth bass were reared and distributed with the large-mouth bass during the fall. During the winter the west pond, which covered an area of  $6\frac{1}{2}$  acres, and which had been devoted for a number of years to the rearing of shad, was divided by means of a partition (397 feet long) into two ponds, one to be devoted to the rearing of bass and the other to shad.

In April the adult black bass were placed as usual in the partitions in the north and south ponds and in that part of the west pond devoted to their culture, but owing to the low temperature prevailing in the spring months they did not commence spawning until about the middle of May. A number of nests were observed about the 20th and one pair spawned on the night of May 23 in the Eagle Pond, where an excellent opportunity for watching the development of the eggs was afforded. On May 25 the dark spots indicating the eyes were conspicuous, and on the fourth day the fry burst from the shell. They seemed to lie motionless at the bottom of the nest until the 29th, when they rose a few inches in the water but did not leave the nest until the following day, when they began to take on a darker color. Another nest in the south pond was first noted on the 25th. Two days afterwards the first fry appeared, and by the 28th the entire brood was hatched. They remained on the nest until June 1, when they commenced to rise in a similar manner to those observed on the first nest. A number of other nests were noticed on the 26th and 29th of May, and it was observed that the eggs remained 4 to  $4\frac{1}{2}$  days before they hatched, the fry rising from the nests 3 to 5 days later. The period of incubation depends on the temperature of the water.

A series of temperatures taken at 7 o'clock in the evening from May 23 to June 2 was as follows, the mean being  $73^{\circ}$ :

| Date.       | Temp.        | Date.       | Temp.        |
|-------------|--------------|-------------|--------------|
|             | $^{\circ}F.$ |             | $^{\circ}F.$ |
| May 23..... | 74           | May 29..... | 70           |
| May 24..... | 73           | May 30..... | 72           |
| May 25..... | 70           | May 31..... | 76           |
| May 26..... | 67           | June 1..... | 81           |
| May 27..... | 73           | June 2..... | 77           |
| May 28..... | 72           |             |              |

As soon as the spawning season was over the adults were removed from the spawning partitions and the young were allowed to pass into the main body of the pond, which had been thoroughly stocked with

aquatic plants and water lilies, where they found an abundance of natural food. In addition to this several hundred thousand carp were liberated in the pond, which fell victims to the young bass in two or three weeks.

During the fall 400 crappie were distributed as the result of the season's spawning. In the spring of 1900 the adults were again placed in two small ponds and, though no definite estimate can be made as to the number of fish on hand, it is believed that the pond will yield several thousand in the fall.

When making collections of food-fish in the Potomac River a number of sun-fish, *Lepomis pallidus*, were captured. These spawned in the spring, and as a result 850 young fish were available for distribution in the fall. This fish was undoubtedly introduced from the Mississippi River, as it is not indigenous to the Potomac. It is believed that it will be well adapted for stocking small inland ponds.

As in previous years, hundreds of thousands of carp were raised as food for the bass. Some little attention was also paid to the rearing of yellow and green tench for stocking public parks and lakes.

During September the shad which had been placed in the ponds the previous April were liberated. It is estimated that about 2,000,000 passed into the Potomac River. In the following spring 2,849,500 shad fry were placed in this pond. They are apparently doing well and will be liberated in the fall.

CENTRAL STATION, WASHINGTON, D. C. (J. E. BROWN IN CHARGE).

Work at this station has been conducted on the same lines as heretofore, the most important being the distribution of the output from the fish ponds, which amounted to 32,967 young black bass, 400 crappie, and 500 sun-fish. These were distributed without loss. There were also received from Wytheville, Va., 600 rock bass and 2,839 yearling rainbow trout, and from Erwin 4,931 brook trout.

During the fall and winter months consignments of landlocked salmon and white-fish eggs were received from various stations of the Commission and hatched for the purpose of illustrating fish-cultural methods. Consignments of shad eggs were also received from Battery and Bryan Point. The following table shows the number of eggs of various kinds received and fry hatched and distributed:

| Species.               | No. of eggs received. | No. of fry hatched and distributed. |
|------------------------|-----------------------|-------------------------------------|
| Rainbow trout.....     | 9,285                 | 6,000                               |
| White-fish.....        | 475,000               | 256,000                             |
| Lake trout.....        | 10,000                | 8,368                               |
| Landlocked salmon..... | 4,000                 | 3,850                               |
| Shad.....              | 7,896,000             | 7,896,000                           |
| Total .....            | 8,394,285             | 8,170,218                           |

## AQUARIUM AT CENTRAL STATION, WASHINGTON, D. C. (L. G. HARRON IN CHARGE).

During the summer the aquaria were thoroughly overhauled, broken glass replaced, and the slate and iron work of the salt-water tanks painted with asphaltum to prevent rust; a new trough for carrying off the overflow from the salt-water tanks to the filter was built, and the salt-water supply, amounting to about 5,000 gallons, was renewed.

In September the superintendent, assisted by Mr. W. T. Lindsey, commenced the collection of marine specimens at Willoughby Spit, Va., near Fortress Monroe, where the shipping facilities are good, and by the end of that month 549 specimens, representing 30 species, had been collected and transferred without loss to Washington. In October 319 specimens, representing 11 species, including two tropical fishes—the snowy grouper and the big-eye—were brought from Woods Hole, Mass. These with the addition of sea-anemone and starfish from Gloucester, filled all the available space. The salt-water fishes were carried without loss until February, but at that time the water temperature became too low for them, due to inability to circulate it fast enough through the heaters to produce the desired warmth. Aside from this there was little mortality until May, when the death-rate increased on account of the rapid rise in temperature, though a number of specimens, representing 12 species, were on hand at the close of the year.

As usual, a good exhibit of fresh-water fishes was kept during the summer, consisting principally of species indigenous to the Potomac River and the Chesapeake Bay, with the various ornamental fishes. Most of these specimens have been kept in the aquarium from two to four years. Consignments of brook trout, rainbow trout, steelheads, Atlantic and landlocked salmon transferred from Wytheville, Va., and Craig Brook, Me., in October, were exhibited in the aquarium until May, when the temperature rose above 70; they were then planted in suitable streams in the vicinity. While in the aquarium they grew very rapidly, and when disposed of were more than twice as large as when received from the stations.

Two species spawned in the aquarium during the year—four yellow perch and two yearling brook trout—but none of the eggs hatched.

The food used during the year consisted chiefly of beefsteak, beef liver, clams, oysters, and minnows, the principal articles being steak and liver. The meat is prepared for them by first removing the fat and then cutting it in pieces according to the size of the fish. Clams, oysters, and minnows are fed only to such fishes as will not take meat when first captured, but all of them learn to eat beef after being in captivity for some time.

As the water pressure is not sufficient in extremely cold weather to operate the salt-water pump fast enough to keep the temperature where desired, it is recommended that a small engine be installed for this purpose.



Following is a list of marine and fresh-water fishes and crustaceans exhibited during the year:

*Salt-water fishes:* Pig-fish, pipe-fish, toad-fish, file-fish, sea trout, pin-fish, sea bass, gray snapper, black drum, croaker, spot or goody, hog-choker, pompano, flounder, tautog, lizard-fish, yellow-tail, spade-fish, sea-robin, jumping mullet, striped bass, sea anemone, bur-fish, skate, sculpin, cunner, big-eye, snowy grouper, scup, remora, chaetodon, stickleback, mummichog, blue crab, lobster, hermit crab, spider crab, shrimp, horseshoe crab.

*Fresh-water fishes:* Brook trout, Atlantic salmon, steelhead trout, rainbow trout, quinnat salmon, Scotch sea trout, landlocked salmon, large-mouth black bass, small-mouth black bass, rock bass, pickerel, gar pike, common tench, golden tench, goldenide, gold-fish, crappie, common suckers, sun-fish, yellow perch, white perch, mill roach, paradise-fish, common eel, yellow cat-fish, channel cat-fish, salamander, terrapin, snapping turtle.

The following shows the salt-water and fresh-water temperatures:

| Month.         | Fresh-water temperatures. |      | Month.         | Salt-water temperatures. |      |
|----------------|---------------------------|------|----------------|--------------------------|------|
|                | Max.                      | Min. |                | Max.                     | Min. |
|                | °F.                       | °F.  |                | °F.                      | °F.  |
| July.....      | 82                        | 79   | September..... | 69                       | 54   |
| August.....    | 82                        | 79   | October.....   | 69                       | 52   |
| September..... | 78                        | 71   | November.....  | 64                       | 51   |
| October.....   | 66                        | 60   | December.....  | 60                       | 48   |
| November.....  | 60                        | 46   | January.....   | 58                       | 44   |
| December.....  | 46                        | 34   | February.....  | 68                       | 42   |
| January.....   | 38                        | 34   | March.....     | 60                       | 48   |
| February.....  | 38                        | 34   | April.....     | 68                       | 48   |
| March.....     | 42                        | 35   | May.....       | 72                       | 54   |
| April.....     | 63                        | 42   | June.....      | 80                       | 62   |
| May.....       | 71                        | 62   |                |                          |      |
| June.....      | 78                        | 68   |                |                          |      |

During the summer and fall 26 fry-collector aquaria were built under the direction of the superintendent of the aquarium for use at the Bryan Point, Battery, and Edenton stations. These were made with glass sides and ends, slate bottoms, and galvanized iron frames, the dimensions being 48 inches by 18 inches by 16 inches. The lowest bid received for their construction from private firms was \$40.77 each, and the actual cost of building them, exclusive of labor of regular employees, was \$13.62 each.

WYTHEVILLE STATION, VA. (GEORGE A. SEAGLE, SUPERINTENDENT).

The number of fish on hand at the beginning of the year is shown by the following table:

| Species.                      | Calendar year in which fish were hatched. |       |       |       |       |                  |
|-------------------------------|---|-------|-------|-------|-------|------------------|
|                               | 1899.                                     | 1898. | 1897. | 1896. | 1895. | 1894 or earlier. |
| Rainbow trout.....            | 128,360                                   | 3,008 | 2,972 | 511   | 647   | 512              |
| Black bass (small-mouth)..... |   | 26    | 21    |       | 5     |                  |
| Black bass (large-mouth)..... |   |       | 37    | 36    | 18    |                  |
| Crappie.....                  |   |       | 12    |       |       |                  |
| Rock bass.....                |   |       | 32    |       | 80    |                  |
| Quinnat salmon.....           |   |       | 100   |       |       |                  |
| Carp.....                     |   |       |       |       | 20    |                  |
| Total.....                    | 128,360                                   | 3,034 | 3,174 | 547   | 770   | 512              |

The distribution commenced in September and continued until December 21, and included 96,965 yearling and 1,074 adult rainbow trout, besides 16,147 brook trout transferred to Wytheville from Erwin, Tenn., 4,400 rock bass and 8,540 black bass, of which 6,569 were reared at the fish ponds in Washington.

The food used in the summer consisted as usual of beef liver and mush boiled in varying proportions, according to the size of the fish.

The stock of breeding rainbow trout on hand at the commencement of the spawning season numbered about 5,000, ranging in age from 1 to 10 years old, though fish under 3 years of age are not apt to produce many eggs. The spawning season opened November 6 and lasted to February 12, during which period 990,000 eggs were taken from 998 fish, an average of 992. The number of male fish used was about 800. The variation in the size of the eggs taken was unusually great, and was no doubt caused by the great difference in the age and size of the spawners. They ran from 312 to 445 to the ounce, the average for the season being about 387. The eggs from all of the fish were smaller than they have ever before averaged at this station, and there appears to have been a decided change in the habits of the fish for the past two years as regards the time of spawning. Formerly at least 80 per cent of the eggs taken were secured at night, but this season and last 50 per cent or more have been collected during the day. This change is thought to be due to modification in the shape of the spawning-ponds, the new ones being diamond-shaped and offering a more inviting entrance to the raceways. Of the eggs collected 174,500, or a little over 17 per cent, were unfertilized or lost during incubation, 377,000 were hatched, and 438,500 were shipped to other stations and to foreign applicants. The consignments to Ireland and England reached destination in excellent condition, although en route from 10 to 12 days. The fry hatched did well through the sac stage, and are being reared in indoor troughs and ponds outside for distribution in the fall.

For the purpose of introducing new blood in the brood stock, a consignment of 20,000 rainbow-trout eggs collected from wild fish in California were shipped here by the California Fish Commission in April. They had been packed by Mr. W. H. Shelby at Sisson, Cal., and arrived in good condition, considering the distance traveled and the warm weather at the time. They were at once transferred to hatching-troughs and produced 16,500 fry, 3,500 of which died in a few days, having hatched prematurely. The balance were on hand at the close of the year and in excellent condition.

A consignment of 38,400 brook-trout eggs was received in February from Massachusetts, but they were of inferior quality and hatched slowly and unsatisfactorily, thousands dying before leaving the shell. By the time the yolk-sac was absorbed over 22,000 had been lost, and on June 30 there remained about 14,000 fingerlings. A few brook trout were retained from the hatch of last year and are now being

held in the ponds as an experiment. They have grown well so far and it is hoped they will spawn next season.

Owing to the unsatisfactory condition of the ponds the black-bass work at this station has not been successful in the past, but it is hoped, with the improvements made during the past year, that better results will be secured hereafter. Early in the spring the brood stock, consisting of 82 large-mouth and 47 small-mouth bass, was transferred to the breeding-ponds. Large beds of clean creek gravel were provided for nest building, and by June a number of nests containing young fish and eggs had been observed. The fry will be transferred to rearing-ponds as soon as they are large enough and every effort will be made to rear a good crop.

For the reasons given above rock-bass culture has been a failure during the past few years. The brood stock has been increased and there are now 190 on hand. These were placed in the ponds in the spring and artificial portable nests (heretofore described) provided for them. Nearly all the 100 nests put in the ponds have been occupied, and a number of fry have been noted, though it is impossible to give an estimate at this season of the number on hand.

About 20 adult carp are kept at the station. In May they are placed in the trout ponds for the purpose of cleaning out foreign matter and for destroying the lime plant, algae, etc. As soon as they spawn the fry are transferred to the bass ponds as food for young bass.

In December, 1896, about 4,000 eggs of the quinnat salmon were received from the Cape Vincent station. The eggs were hatched and a part of the fry were distributed at the age of one and two years, about 1,000 being retained for further developments. From the time of hatching up to the yearling stage these fish made a very fine growth, but in the spring of the third year they began to grow weak and to lose their sight. The disease continued through the summer and fall, and but few of them were alive by the following winter. The balance were planted in the spring, as it was feared they would all die in the ponds. The water in the pond in which they were confined was less than 4 feet in depth, and it is supposed this was the cause of the failure to acclimatize them.

#### EDENTON STATION, NORTH CAROLINA (S. G. WORTH, SUPERINTENDENT).

Mr. S. G. Worth was appointed superintendent on July 1 and took charge of the station on the 14th, relieving Mr. G. A. Schneider, who had been directing the work of construction.

Notwithstanding the incomplete condition of the station, steps were taken early in March to organize a force for the collection and hatching of shad eggs. There were no trained spawn-takers available in the vicinity, as the fish-cultural work in recent years has been conducted by the steamer *Fish Hawk*; consequently it became necessary to transfer a few from Havre de Grace and Washington to be used as a nucleus in training new men. In addition to other drawbacks the

season proved two or three weeks later than usual, the weather being very unfavorable, and though all the seines, nets, and traps within a radius of 10 to 15 miles were visited daily the new men had little chance to gain experience, and as a consequence became despondent. When the water attained the right temperature for the shad to spawn they came on so suddenly that the apprentices were helpless, having had no opportunity of acquainting themselves with the work. Toward the end they became efficient and sufficiently interested to insure their being reliable spawn-takers in the future, but many eggs were lost in the meantime. Work was pushed vigorously, however, night and day, so that we succeeded in enlisting the sympathy and active cooperation not only of fishermen operating on well-known spawning-grounds, but new fields were developed in the Roanoke River and at Skinner Point, several miles east of Edenton.

The grounds on the Roanoke are virtually confined to the drift gill-netters, who operate very short nets, but they catch ripe shad and in such a way that all of the eggs can be saved. It required unremitting personal effort to enlist their interest, but another year will find them anxious to save the eggs. Their nets were operated mainly within 3 miles of the river mouth, making them easy of attendance and much more profitable than the seines on the upper river, which capture large numbers of fish but furnish very few eggs. It has also been found that numbers of eggs can eventually be secured from trap nets. A number of ripe fish were reported from Mackayes Ferry, but owing to lack of experienced men the nets there could not be attended.

In the shallow waters around the mouth of the Roanoke and Cashie rivers the cooperation of the stake-net gillers was secured and a few eggs obtained. An excellent spawning-ground was developed at Hornblower or Skinner Point, 4 miles below Edenton, one trap net yielding over 800,000 eggs. There is no doubt that this will prove a valuable field next season, but the most important spawning-grounds in the vicinity are on the Chowan River. Unfortunately, no gill-net fishing is done here, but the four seines operated will undoubtedly yield large numbers of eggs. It is also hoped that additional eggs will be received from the traps, large numbers of which are fished on the river. The area covered embraces about 86 square miles, and it is urged that a first-class steamer, capable of running in all kinds of weather, be provided as a part of the permanent equipment of the station. A second boat should also be available for a month or six weeks during the season.

The following table shows the number of eggs collected by localities:

| Collected by—  | Roanoke<br>River. | Chowan<br>River. | Albemarle<br>Sound. | Totals.        |
|----------------|-------------------|------------------|---------------------|----------------|
|                | <i>Number.</i>    | <i>Number.</i>   | <i>Number.</i>      | <i>Number.</i> |
| Gill-nets..... | 2,989,000         | 4,319,000        | 1,660,000           | 4,649,000      |
| Seines.....    | 353,000           | 173,000          | 173,000             | 4,844,000      |
| Traps.....     |                   | 107,000          | 803,000             | 910,000        |
| Total .....    | 3,342,000         | 4,426,000        | 2,636,000           | 10,404,000     |

The collecting season lasted from April 25 to May 10, and the 6,590,000 fry hatched were distributed by May 15 in the Albemarle Sound and tributaries. The loss during incubation was 3,814,000, or about 36 per cent. In view of the fact that there were only four trained spawn-takers available for work, and of the incomplete condition of the station, the results are considered very satisfactory. Moreover, there is no question as to the entire suitability of the water of Pembroke Creek for hatching purposes; the only possible objection that could be made to it is that it is rather warm, making it risky to hold the fry, but this is unnecessary, and it need not be considered an adverse factor. The water was clear throughout the season, without a trace of sediment.

ERWIN STATION, TENNESSEE (ALEXANDER JONES, SUPERINTENDENT).

On July 3 Mr. S. G. Worth was transferred to Edenton, N. C., as superintendent, and Mr. Alexander Jones was appointed in his place, with Mr. J. E. Guard as fish-culturist. During the summer the balance of the special appropriation was expended in the erection of a five-room cottage on the northwest corner of the reservation for the occupancy of the fish-culturist, and other minor improvements were undertaken, the most important of which was the laying of a 12-inch terra-cotta pipe in the south berm ditch to carry off the waste water from the depression at the back of the residence. This added materially to the effectiveness of the station and improved its appearance.

At the beginning of the year there were on hand the following fish:

| Species.            | Calendar year in which hatched. |       |       |                  |
|---------------------|---------------------------------|-------|-------|------------------|
|                     | 1900.                           | 1899. | 1897. | 1896 or earlier. |
| Brook trout .....   | 76,588                          | 991   | ----- | 866              |
| Rainbow trout ..... | 48,545                          | 2,975 | 764   | -----            |

These were kept in troughs and ponds during the summer as usual and fed on ground beef-liver and mush made from wheat shorts; herring roe being also used for feeding the fry. The rainbows are especially fond of this, taking it greedily from the beginning, but the brook trout do not seem to relish it, preferring the beef-liver.

In August the distribution of rainbow trout commenced and was continued until the 9th of December, 43,110 in all being shipped. Of the brook trout on hand at the beginning of the year 31,126 were available for distribution. These were shipped to applicants in Virginia and Tennessee. From the beginning of July to the time of distribution the death-rate was exceedingly heavy, both in ponds and troughs; a great portion of the loss was due to popping of the eyes, though snakes and frogs destroyed quite a number of the fry.

The brook trout spawned from October 27 to December 16, yielding 79,100 eggs. As these fish refused to ascend the raceway it was



necessary to resort to seining to secure their eggs. At first this was done once a day and later twice a day as long as it was necessary. Of the eggs collected 48,000 were hatched, but most of them were affected during the embryo stage and developed white spots on the sac. The death-rate became heavier daily, and it was deemed advisable to plant the remainder at once. Accordingly 9,380 were deposited in streams in the vicinity of the station.

On the 6th of February 145,000 brook-trout eggs were received from Mr. L. B. Handy, of Massachusetts, but they were in very bad condition on arrival, many having hatched in transit, and proved a total loss. On account of the poor success attained with brook trout at this station it has been determined to abandon that work entirely, and the adult fish on hand have been turned over to Mr. B. F. O'Bryant, county fish commissioner, for stocking streams in this county.

The spawning season of the rainbow trout extended from October 25 to January 27, and resulted in the collection of 110,800 eggs from the 3-year-old fish and 30,000 from the 2-year-olds. In addition to these, 238,000 were received from Wytheville and 34,600 from Neosho. The eggs taken at the station yielded 53,570 fry, those from Wytheville 216,137, and from Neosho, 25,912, giving a total of 296,137. At the close of the season there were 130,560 on hand. They were held in troughs in the hatchery until April, when most of them were transferred to the small ponds.

During the fall 15 black bass were purchased and placed in ponds at the station; 9 of them died during the winter; the other 6, 3 of which were females, accepted the artificial nests that had been prepared in pond 31, and about May 20 deposited their eggs, which produced about 25,000 fry. These are on hand at the close of the year. As soon as the schools began to break up the parent fish were removed from the pond, as this was better than to remove the fry.

Natural enemies, such as predatory birds, muskrats, frogs, etc., are very abundant. Those killed during the year comprised 115 snakes, 25 muskrats, 4 Indian hens, 3 wild ducks, 30 kingfishers, 1 osprey, 2 minks. Snakes and frogs are regarded as the most destructive. One of the snakes had 24 young fish in its stomach.

PUT-IN BAY STATION, OHIO (J. J. STRANAHAN, SUPERINTENDENT).

During the summer a new storehouse, 20 by 30 feet and 14 feet high, was built at an expense of \$331. The steamer *Shearwater*, which had been in use for a number of years, was thoroughly repaired, so that it is now in serviceable condition and will last for several years. The 10-inch suction pipe running into the lake to the westward of the station, which had been carried away by ice in 1899, was replaced by the station force at an expense of less than \$100. The lowest bid received for the performance of this work by contract was \$750.

The white-fish season opened unfavorably and was peculiar in certain important particulars; the temperature of the water during



November was very warm, closing at  $44^{\circ}$ , the lowest point reached during the month. The season was consequently very late and short, lasting only about fifteen days, the first eggs being taken from the nets on November 17 and the last on the 30th. It was also remarkable from the fact that not a single gale or storm occurred during the month to interfere with operations.

The methods followed were the same as heretofore; that is, in addition to the eggs collected directly from fish caught in pounds and gill nets, a large number were penned at Put-in Bay and Monroe Piers, Michigan. From the pound and gill nets 94,843,000 eggs were secured, 54,639,000 from fish penned at Put-in Bay, and 86,688,000 from those at Monroe Piers. The difference in the expense of collecting at the various points and by the various methods was as follows: Eggs furnished by fishermen, 60 cents per quart; those collected at Put-in Bay, 58 cents; from Monroe Piers, 69 cents.

The loss of fish by disease in the live-boxes was very slight. Of the 14,706 placed in the subnets and transferred to crates, 13,257 were returned to the fishermen, 233 died, and 1,216 escaped through accidents which could not be foreseen. The total number of females stripped from the pens was 4,432. The average yield of eggs at Put-in Bay was 36,547 per fish, and at Monroe Pier 23,387. The total cost of collection at both points was \$3,995.

Of eggs collected at Monroe Piers 35,000,000 were shipped to Cape Vincent and 21,000,000 to Duluth. The balance were transferred to the Put-in Bay hatchery and later in the season 5,832,000 were assigned to the Pennsylvania Commission and shipped to their Erie station; 10,000,000 were also assigned to the New York Fish Commission. The remainder were hatched, and produced 109,890,000 fry, which were planted in April on the spawning-grounds in Lake Erie.

During the winter a series of experiments was carried on with the view to determining whether fertilization takes place when the eggs and milt are brought together without the admixture of water. On three successive days, December 17, 18, and 19, several lots of eggs and milt were so held, great care being exercised to prevent the admixture of any water. They were kept twenty-four hours in corked glass jars submerged in running water, and at the end of this period lots of 100 each were examined separately under the microscope. The first series showed an average of 16 per cent where the second cleavage was completé. About one-third of the rest were in all stages of development, from those where the disk was forming to those where the second cleavage was well under way. After these eggs had been twenty-four hours longer in running water, about half of them showed the second cleavage complete, and the rest were more or less advanced in development. The temperature of the water while the experiments were being made was from  $36^{\circ}$  to  $37^{\circ}$ .

A series of experiments was also conducted to discover, if possible, the causes of monster embryos in fish eggs, especially those partaking

of the twin character or having more than the normal number of organs. It is conceded that monsters can be produced in the eggs of chickens by injury to the eggs at a certain critical period, but it is held by some embryologists that they are also likely to be produced by more than one spermatozoon entering the egg through the micropyle at a time when sufficient water has entered the egg through its membranes to lift them from the disk.

The first experiments were with the view to producing monsters by injury to the egg. For this purpose a half ounce of eggs from a given lot was placed in a strong 4-ounce glass jar, which was then half filled with water and securely corked. It was then dropped ten times into a wooden pail, half filled with water, from a height of 4 feet, striking the bottom of the pail with considerable violence. Nine lots were subjected to this treatment, commencing with the first lot half an hour after impregnation, the second lot an hour later, and from then once an hour until they had all been handled. After the eggs had been forty-eight hours in running water, 100 of each of the nine lots were examined under the microscope, and only one twin disk was found, and that not well defined, showing that injury had not caused the monstrosity to any extent. The experiment resulted, however, in what to the writer was a most startling discovery. Five lots of 100 each, taken from the same lot from which eggs for the experiments had been procured, showed but 3.4 per cent unimpregnated eggs and but few ruptured yolks, while those subjected to the injury process showed large numbers that appeared unimpregnated, the disk being hemispherical, semitransparent, amber-colored, and devoid of all appearance of segmentation. It is certain that all of these eggs were dead.

The following table shows the number appearing normal, number with ruptured yolks, and number having the appearance of being unimpregnated:

| Character.                | 30 min-<br>utes. | 1½<br>hours. | 2½<br>hours. | 3½<br>hours. | 4½<br>hours. | 5½<br>hours. | 6½<br>hours. | 7½<br>hours. | 8½<br>hours. |
|---------------------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Eggs, normal .....        | 36               | 53           | 61           | 64           | 66           | 65           | 66           | 89           | 88           |
| Eggs, ruptured yolk ..... | 57               | 36           | 27           | 15           | 12           | 9            | 8            | 3            | 3            |
| Eggs, unimpregnated ..... | 7                | 11           | 12           | 21           | 22           | 26           | 26           | 8            | 9            |
| Twin disks .....          |                  |              |              |              |              |              | 1            |              |              |

One twin disc was also found among the five lots of eggs which had not been submitted to the injuring process. In another experiment eight lots of eggs were given ten shakes each with as uniform force as possible with the right arm. The results were substantially the same as in the above, with the exception that there were more ruptured yolks than in the former case. There is obviously but one conclusion to be drawn from these experiments, and that is that the larger portion of the eggs which seemed under the microscope to be unimpregnated were really fertilized, but that segmentation had been arrested as a result of the injuries received. If this be true, it demonstrates that in many instances where eggs have been thought to be unfertilized they

were impregnated, but segmentation had been stopped on account of injury to the disc, and as this loss often runs up to one-third of the whole number in the case of pike-perch eggs, it is apparent that much care should be exercised in handling them up to the point where they are fully cushioned with water. This view was fully sustained during the season of 1899, in the case of several lots of eggs taken from the boats of the fishermen in the immediate vicinity of the station and manipulated with great care on the floor of the hatching-house. These eggs, some twenty jars in all, yielded from 80 to 90 per cent of fry, and were by far the best in the house.

Four lots of eggs were held for a short time in a weak solution of common salt before applying the milt, it being maintained by some biologists that the brine would tend to weaken the resistive power of the egg, and that therefore more than one spermatozoon might enter the micropyle. One lot was held 3 minutes in a  $2\frac{1}{2}$  per cent solution, washed for 1 minute with several changes of water, the milt then being applied. In the next lot a 5 per cent solution was used, the eggs remaining in it for 3 minutes before washing, and with the next two lots  $2\frac{1}{2}$  and 5 per cent solutions were employed, the eggs remaining therein for 4 minutes. Not a twin disc was found among 2,000 eggs so treated and examined.

It seems remarkable that this treatment did not appear to materially injure the eggs. Only in the lots where they were held in the solution for a period of 4 minutes was there any perceptible difference, the percentage of unfertile eggs being greater in these than in the lot normally treated from which they were taken, but this was doubtless owing to the length of time that elapsed between the taking and the fertilizing of the eggs.

On the 1st of April Mr. Stranahan was appointed superintendent of the Bullochville station, and pending the arrival of Mr. S. W. Downing, who had been appointed superintendent at Put-in Bay, the pike-perch work was directed by the foreman, Mr. J. C. Fox. The season was late. The ice did not disappear until the latter part of March, and by the time the fishermen got their nets set a large proportion of the fish had spawned. In fact, there was apparently no run of spawning fish, only a few scattered ripe ones being found.

As the experiment of penning pike perch had been very unsatisfactory the previous season, it was not attempted this year. The first eggs were received from the Port Clinton field on the 19th of April, and the last from the same point on April 28. Spawn-takers were also stationed at Monroe, Mich., Toledo, North Bass Island, and Put-in Bay, the collections from all points aggregating 138,900,000 eggs. These were of such poor quality that only 57,000,000 of them were eyed, of which number 25,000,000 were transferred to the Michigan Fish Commission, at Detroit. The balance were hatched and distributed, 20,500,000 being planted on the spawning-grounds in Lake Erie and 6,500,000 sent to applicants in Ohio and Indiana for inland lakes.

## NORTHVILLE AND SUBSTATIONS IN MICHIGAN (F. N. CLARK IN CHARGE).

The results attained at Northville and auxiliary stations in Michigan the past year have been most satisfactory, the output far exceeding that of any previous year. The failure of the State legislature to provide the necessary funds made it impossible for the Michigan Commission to propagate any of the commercial fishes of the Great Lakes; hence arrangements were made early in the year for the U. S. Fish Commission to operate the Detroit white-fish hatchery, including fishing rights on Belle and Grassy islands, and later on it was also decided to utilize the State hatchery at Sault Sainte Marie for hatching a part of the eggs collected at Detroit.

Under the provisions of the Milliken act, passed by the Michigan legislature the previous year, the U. S. Fish Commission was authorized to collect lake trout and white-fish during the close season, which extends from November 1 to December 15. Although fishermen from all parts of the lakes applied to the agent of the Commission for permission to fish during the close season, he determined, after careful consideration, to confine lake-trout operations to three important spawning-grounds in Lake Michigan—Charlevoix, Beaver Island, and Manistique. It was feared that this decision would arouse the enmity of influential fishermen in other sections of the State, but the difficulty was overcome by a candid statement of the facts by the superintendent, and the pleasant relations which have always existed between the U. S. Fish Commission and the lake-trout fishermen of Lakes Michigan and Huron still continue.

The agreement entered into with the fishermen provided that after October 30 they should fish under the direction of the superintendent, at such times and points as he might designate, they to pay the expenses of the men and furnish tugs and fishing paraphernalia, receiving all of the fish taken, while the Commission was to have the eggs free of expense. About the middle of October, Mr. B. G. Filkins proceeded to Charlevoix and arranged with the fishermen for fishing and spawning operations at that point. After getting everything in satisfactory condition there, the work was left in charge of Mr. R. K. Robinson, and Mr. Filkins went to Beaver Island to make similar preparations. The fish at the latter point commenced spawning on October 24, but only 10 gallons of eggs were taken during the balance of that month. The fishing was continued until November 10, and resulted in the collection of over 7,000,000 eggs. Of the total number secured here only about 700,000, or 10 per cent, were taken during the open season; consequently the work would have been a failure had operations ceased on October 31.

At Charlevoix the fish were very late in making their appearance on the spawning-grounds and no eggs were collected until after November 1. From that time to the 8th, 1,842,000 were obtained, and on that date Mr. Robinson was directed to discontinue fishing in view of the fact that large numbers of eggs were being taken at other points.

Mr. George Platts, who has been in the employ of the Commission for a number of years, was placed in charge at Manistique, and as the fish had been observed to spawn there in the past much earlier than at any other point in Lake Huron or Lake Michigan, it was supposed large numbers could be collected during the open season, but none were taken until October 26. From that time to November 10, when work was discontinued, over 6,000,000 were secured.

As the result of operating at these three points 15,250,000 lake-trout eggs were obtained and shipped to Northville, packed as usual on canton-flannel trays, the first shipment reaching the station on November 2 and the last November 13. From Northville 1,500,000 were transferred to the State Fish Commission, 1,000,000 were sent to Alpena, and 4,117,000 were consigned to other stations of the Commission, State fish commissions, and private applicants, leaving 8,633,000 to be hatched. These produced about 7,000,000 fry, 6,535,000 of which were planted in Michigan waters in February, March, and April. The balance were retained and at the close of the year they number about 145,000. They are between 2 and 3 inches long and are apparently healthy and strong.

Although the hatchery was overcrowded with eggs, no heavy losses occurred from disease or other causes. On December 21, the creek water ceased to flow about 5 o'clock in the morning, but the incident was promptly discovered by the watchman and the spring water turned on. There were a great many eggs in the house at the time, and but for his prompt action heavy losses would have ensued.

The wisdom of limiting the work to the three points mentioned was clearly demonstrated by the results, the eggs being collected and delivered at Northville for less than \$700, or about 5 cents per 1,000.

To guard against all of the eggs hatching at once and overcrowding the hatchery, the development of a part of them was retarded by the use of creek water, which is colder than that from the spring, the creek water at this time averaging about 35° and the spring water 45°. In this way the distribution was extended from the middle of February until April, whereas had the warmer water been used they would all have come out at the same time, and it would have been impossible to have handled them. The first eggs hatched on January 17 and the last on March 8, a difference of fifty-one days.

At the beginning of the year there were 90,000 lake-trout fry on hand; when distributed in August they numbered 88,000, and ranged from 3½ to 4½ inches in length.

On July 1, 1899, there were on hand at Northville 31,493 brook trout. These were held in ponds which had been lined with stone cement, but they commenced dying in July, though special attention had been given them and the ponds had been kept perfectly clean and were exposed to the sun and air before they were introduced. On August 7, when the distribution commenced, there were only 8,000 fingerlings,



1,100 two year olds, and 154 two and three year olds. These were distributed in New York with the exception of the 154, which were liberated in Sturgeon River, Michigan. In the winter 368,710 brook-trout eggs were purchased from one of the commercial hatcheries in Massachusetts. On their arrival at the station 9,675 were dead. The balance hatched in March, producing 333,518 fry, or 93 per cent of the good eggs received. They were hatched in spring water between March 7 and 28, and the fry commenced feeding April 10. Half of them were fed on beef liver and the remainder on carp. Those fed on the liver were in better condition at the close of the year than the others, being larger and healthier, though it seemed at first that the carp-fed fry would be superior. The poor results attained with the latter are attributed to the fact that the use of carp as food pollutes the water, discoloring it and leaving an oily scum on the surface. This difficulty is not encountered to any extent in using liver.

On April 12 the distribution of the fry was commenced, and by the 25th of May 257,500 had been liberated.

For purposes of experiment 1,000 grayling fry were held over from the hatch of the previous year and fed on finely pulverized liver, the size of the pieces increasing with the growth of the fish. On July 31 the largest of them were an inch long and by the end of August 1½ inches. In September, when they were counted and transferred from the troughs to Pond Q, they numbered 585. They grew slowly during the winter, but increased in size very perceptibly during the spring months, and at the close of the year the remaining 300 measured from 3½ to 7 inches in length. On the 11th of June 70,000 eggs arrived from Bozeman. The temperature at the top of the case on arrival was 52°, but in the center it registered 47°. The eggs showed evidence of great care in packing, and about 25 pounds of ice remained in the case. They measured 810 to the fluid ounce. The hatching was done on trout trays with spring water, the first fry appearing on June 13 and the last on the 23d. When first hatched the fry lay on the bottom from two to four days, until the sac was absorbed. They then rose to the surface and appeared to be vigorous and active. From the 70,000 eggs received 56,000 fry were planted in the various branches of the Rifle River, Pere Marquette River, and Baldwin Creek.

During February 13,650 rainbow-trout eggs arrived from Manchester in very bad condition, and though they yielded 12,860 fry they were so weak that 7,000 of them died before the absorption of the sac. The 385 rainbow trout hatched at the station several years ago were given to private applicants in August, it having been decided to discontinue the rearing of these fish at Northville.

Of the 3-year-old Loch Leven trout, 195 females spawned in November and December, which is much later than usual. The older fish also produced a few eggs, but they were of no value, 50,950 being secured from the entire stock. When they were sufficiently developed for shipment, 20,000 were sent to the New Hampshire Commission and



6,000 to Prof. W. A. Lacy of the Northwestern University, Evanston, Ill., for experimental work. The balance were hatched in February, and after being fed for several weeks 8,000 of the fry were distributed, and there remained on hand at the close of the year 8,590.

Of the 5,000 steelheads on hand from the hatch of June, 1899, 4,500 were planted in September in Baldwin Creek. In May, 1900, the 2-year-old steelheads numbered 1,633 and the 3-year-olds 469. These fish showed no signs of spawning.

The hatchery at Detroit, which was turned over to the Fish Commission, is located in the center of the city and is a frame structure 80 feet long by 40 feet wide, with a wing 48 by 36 feet. The building belongs to the Michigan Fish Commission, and the grounds on which it is located to the estate of John Pridgeon, the rental being \$425 per annum. The hatchery is equipped with 1,000 Chase jars, which have a capacity for about 162,000,000 eggs, estimating 162,000 per jar. The water, which is well adapted for this work, is furnished by the Detroit Board of Water Commissioners, at the rate of  $1\frac{3}{4}$  cents per 1,000 gallons. Its average temperature in March was 33°, and in April it ranged from 33° to 50°, reaching that point on the day the hatching was completed.

The three fisheries included in the transfer are the East Point, Willis Ground, and Grassy Island, the two former being located on Belle Island, and the other on an island about 8 miles southwest of Detroit in the Detroit River. At the time of the transfer the hatchery was in only fair condition, as new sills had to be put in two sides of the building, the floor needed repairing, and the tanks painting.

To simplify the work arrangements were made with the Wolverine Fish Company, of Detroit, to operate the fisheries and to receive as compensation the fish captured after the eggs had been stripped and turned over to the Commission. Fishing commenced in October and continued to December 20, resulting in the capture of 33,112 white-fish. Of these 6,046 undersized ones were liberated, and the balance were held in live-cars until ripe. The apparatus used at all of the fishing-grounds was the ordinary haul seine, operated by means of capstans and horsepower. Fishing was conducted night and day by separate crews, and the catch was unprecedented, the most successful work ever recorded before only aggregating about 14,000, less than half the number captured this year. This is believed to be attributable to the large plants of white-fish fry made in past years by the National and State Fish Commissions in Lake Erie and the Detroit River.

The fish caught at East Point were transferred to the Willis Ground fishery, where the live-boxes and ponds were established. The live-car was a boat about 14 feet long, 3 feet wide, and 14 inches deep, pointed at both ends, with slats on the bottom running lengthwise. Two water-tight bulkheads were fitted in either end to keep the water from rushing through and crowding the fish into the rear end and smothering them. One of these boats can safely carry 200 fish from

2½ to 3 pounds in weight, and as many as 270 have been brought down on one trip. At first only 100 were placed in the boat, but on arrival at destination many of them were found to be badly bruised, and after that they were packed in tightly, so that they would be unable to move around and injure themselves. The experiment was successful, and thereafter all fish were transferred packed in as closely as possible.

Owing to the warm weather a great many of the females became plugged early in November, 105 being removed at one time. This condition was believed to be also due to some extent to their confinement in the crates. A pond, 16 feet by 40 feet, was therefore constructed in water 3 feet deep, by sharpening 6-inch boards and driving them into the river bottom, which was covered with 3 inches of soft mud, with gravel underneath. In this inclosure 2,200 male and female white-fish were placed, and at the end of 3 days it was noticed that they had whipped off all the mud, the gravel being plainly in sight. Commencing a week later, all of the females except 173 were stripped, and only 10 plugged fish were found. The 173 were transferred to a crate, and though apparently in perfect health, in less than a week half of them were plugged. It would thus appear that it is better to hold the fish in ponds constructed in the river, though at Grassy Island the percentage of plugged females was less than at Willis Ground, although the fish were held altogether in crates. The process followed in stripping the eggs was practically the same as in past years, all of the fertilizing being done by the dry method, though the milt was taken before the eggs.

Fishing commenced at Grassy Island on October 7 and closed the 3d of December, 4,563 male and 5,870 female fish being taken. The spawning season here lasted until the 19th of December, 4,460 of the females crated, or about 76 per cent, yielding 108,288,000 eggs.

At the other two points fishing commenced on October 23 and continued to the end of November, resulting in the capture of 7,323 females and 9,310 males. 4,905 females yielded 137,952,000 eggs, an average of 28,124 per fish.

All of the eggs collected were transferred promptly to the Detroit hatchery; where they were either placed in jars or reshipped to other stations. During the season 2,508 hauls of the seine were made. The average number of white-fish taken per haul (including also immature specimens) was 13, the catch of mature white-fish per haul averaging 11.

The total number of eggs collected was 246,240,000, of which 48,020,000 were transferred to the Alpena hatchery, 40,732,000 to the Sault Ste. Marie, 22,220,000 to Duluth, and 2,379,000 to other stations and private applicants. The balance were hatched at Detroit and distributed in April, by tugboats, in the Detroit River, Lake St. Clair, and Lake Michigan, near Frankfort, Charlevoix, and Beaver Island, most of them being liberated in Detroit River and Lake St. Clair.

As the Detroit hatchery was overcrowded, the Alpena station was

opened on November 27, on which date 47,520,000 white-fish eggs were received. Later on 500,000 more were transferred. The eggs were hatched in the Chase and the McDonald jars and produced 36,500,000 fry, or about 76 per cent of the number of eggs handled. These eggs were green, having been transferred direct from the seining-grounds, consequently the percentage hatched was better than would at first seem. In April the fry were distributed by tugboats in Lake Huron and tributaries, inside a radius of 50 miles from the station.

The water supply for the Alpena station is pumped from Thunder Bay and is quite clear and pure. When the eggs were first received its temperature was 42°, but by December 13 it had fallen to 34°, where it remained until February, when it registered 33°. In March it ranged from 33° to 35°, and in April averaged 41°.

On February 15th 1,000,000 eyed lake-trout eggs were transferred from the Northville hatchery. They hatched with practically no loss and all of the fry were planted in Lake Huron during April, with the exception of 100,000 deposited in Beaver Lake. The plants were made with tugboats loaned by the fishermen.

To further relieve the Detroit hatchery it was arranged to transfer a part of the eggs to the State hatchery at Sault Ste. Marie, and 40,732,000 were sent to that point in December, January, and March. In December the water was cut off from the hatchery for 11½ hours by the formation of anchor ice and the freezing of the wheels belonging to the electric power company. The eggs were at once placed on flannel trays and the temperature kept down to 34°. No further trouble was experienced, but it is probable that the eggs then in the hatchery were slightly damaged by this accident. The temperature of the water reached 32° by December 24 and remained at 32° until April 13, when it ranged from 33° to 43° until May 1, when the last of the fry were planted. From the eggs transferred 25,000,000 fry were hatched, 10,000,000 being planted in Lake Huron, off Detour, and 15,000,000 in Lake Superior and tributaries.

The Commission is indebted to A. Booth & Co. for transferring fry without expense; also to fishermen at Detour for similar courtesies. The work at this point was under the immediate direction of H. H. Marks, of the Michigan Commission. At the close of the season the hatchery was cleaned up and turned over to the State Fish Commission.

The following table shows the total number of eggs collected during the year, eggs shipped, and fry distributed:

| Species.               | Eggs collected. | Eggs shipped. | Fry distributed. |
|------------------------|-----------------|---------------|------------------|
| White-fish .....       | 246,240,000     | 24,601,000    | 163,500,000      |
| Lake trout .....       | 15,250,000      | 5,617,000     | 7,530,000        |
| Brook trout .....      | 359,035         |               | 257,500          |
| Loch Leven trout ..... | 50,950          | 26,000        | 8,000            |
| Rainbow trout .....    | 13,650          |               | 3,000            |
| Grayling .....         | 70,000          |               | 56,000           |
| Total .....            | 261,983,635     | 30,244,000    | 171,354,500      |

The following shows the fish on hand at the close of the year:

| Species.               | Calendar year in which fish were hatched. |       |       |       |                  |
|------------------------|---|-------|-------|-------|------------------|
|                        | 1900.                                     | 1899. | 1898. | 1897. | 1894 or earlier. |
| Steelhead trout -----  |   |       | 1,630 | 460   |                  |
| Loch Leven trout ----- | 8,400                                     |       | 244   | 677   | 50               |
| Lake trout -----       | 145,000                                   |       |       |       |                  |
| Grayling -----         |   | 292   |       |       |                  |
| Brook trout -----      | 15,000                                    |       |       |       |                  |
| Total -----            | 168,400                                   | 292   | 1,874 | 1,137 | 50               |

DULUTH STATION, MINNESOTA (S. P. WIRES, SUPERINTENDENT).

In the summer arrangements were made for collecting lake trout and white-fish in the vicinity of Port Arthur, Ontario; Grand Portage, Minn., and at Isle Royale, Ontonagon, Houghton, Keystone, and Montreal River, Michigan. Lake trout commenced spawning in the vicinity of Port Arthur and Isle Royale about September 20 and in Michigan during October. The collections were unusually large, and could have been greatly increased had it not become necessary to discontinue fishing in compliance with the closed-season laws of Michigan and Canada. The total collections aggregated 12,400,000, as follows: Rossport and Port Arthur, Ontario, 4,177,000; Houghton, Keystone, and Montreal River, Michigan, 2,076,000; vicinity of Isle Royale, Michigan, 3,758,000; vicinity of Ontonagon, 2,100,000; Grand Portage, Minn., 289,000. During January and March 1,550,000 eyed eggs were shipped to the commissioners of New York, Utah, and Wyoming, and 300,000 transferred to Nashua station; from the balance 9,047,000 fry were hatched and planted during April, May, and June. The total loss of eggs and fry during the season was 1,503,000.

As white-fish had just commenced spawning in the vicinity of Rossport and Port Arthur when the closed-season law took effect, only 200,000 eggs were collected, but in December 44,222,000 were transferred from Put-in Bay and Detroit. The Michigan eggs arrived in very poor condition, and the losses among them were very heavy. In April and May 20,000,000 white-fish fry were liberated.

At the beginning of the fiscal year there were 14,000 grayling fry on hand. These were planted in August in Baptism River, Minnesota. On the 12th of the following May 72,000 grayling eggs arrived in excellent condition from Bozeman; they were placed in McDonald hatching-jars, 36,000 to the jar, and sufficient water was turned on to give them a gentle motion. They commenced hatching on the 19th and finished in four days. As the current of water in the jar was not strong enough to carry the fry out, they were permitted to remain in the jars until all of them had been hatched, when they were transferred to an ordinary trout trough 14½ feet long, 10 inches deep, and 2 feet wide, well supplied with fresh water. They remained on the bottom of the trough, acting very much like lake or brook trout, for from 36 to 40 hours, after which they began swimming near the surface

and commenced feeding. Beef liver chopped very fine and strained through a cheese-cloth bag was given them four times a day. The fry appeared healthy until May 29, when they commenced to drop back in the troughs in an exhausted condition and died rapidly. This was due to the rapid rise in the temperature of the water, which varied from 60° to 72°. Had they been a week or ten days older when the warm weather commenced it would not have affected them seriously, as grayling fry were held the previous summer in warmer water without loss. Plants aggregating 34,000 were made during the spring in suitable waters in Minnesota and Wisconsin.

All of the steelhead trout on hand at the beginning of the year were planted in July in streams in Minnesota and Michigan. On the 17th of May 100,000 eggs arrived from Clackamas, Oreg., in fine condition. These commenced to hatch on the 28th, and by June 5 a large proportion were feeding; by the 10th all of them were taking food nicely. To all appearances the steelhead trout are exceptionally hardy and grow rapidly at this station, and, judging from reports received from streams already stocked, are well adapted for the waters of Minnesota. During the year 148,500 were planted in waters in Minnesota, Michigan, and Wisconsin.

The 100,000 brook-trout eggs received from Colorado in March were hatched late in April and retained in troughs and fed until June, when 91,000 were planted, the total loss of eggs and fry being less than 9,000. At this station brook-trout fry are brined once a week from the time the sac is about one-fourth absorbed until they are distributed.

QUINCY STATION, ILLINOIS (S. P. BARTLETT, SUPERINTENDENT).

The season opened very favorably, young bass being plentiful all along the shores, though the water was too high to work the overflows and ponds. When it receded it was found that the weeds and grass had grown so rapidly that it would be impossible to collect from some ponds which had heretofore yielded large numbers. The bass handled during the summer were much larger than usual, the bulk of them having been hatched the previous year. A large number of adults were captured and shipped.

Crappie were very abundant, but owing to the difficulty in transporting these fish from the fishing-grounds to the station only a limited number were handled until fall. The catch of all kinds of fishes in the river has been larger than for many years, especially of the commoner species, hundreds of thousands of which are saved annually by the Commission.

As a result of the season's work 36,248 yearlings and adult bass were distributed, 9,260 crappie, 2,100 sun-fish, and 22 warmouth bass, besides 4,480 rock bass transferred from Neosho.

The station was reopened in June, 1900, and many thousands of young fish captured, and by the close of the year there were over 18,000 on hand for distribution.



## MANCHESTER STATION, IOWA (R. S. JOHNSON, SUPERINTENDENT).

The construction work in progress at the close of the year was completed during the summer and a considerable number of improvements were made by the station force, the most important being the construction of a frame building, 14 by 21 feet, to be used as a fuel-shed and store-room. The roadways around the 80-foot ponds were graded and graveled, and the land behind the stone protection-wall from the upper spring reservoir was filled in and graded; the walls of the kitchen, mess-house, boiler-house, office, reception-hall, and stairway in the hatchery building were given a coat of paint, and all of the hatching apparatus was thoroughly overhauled and repaired; the rearing-ponds, which were damaged by frost during the winter, were torn out and rebuilt, and considerable repairing was done to the stone protection-wall and dam, which had been injured by the ice-gorge.

Fish-cultural operations were conducted on the same lines as in the previous year, ponds Y, Z, and V being used for the propagation of large-mouth black bass and rock bass. The propagation of crappie was abandoned, as they do not do well at the station, and it is possible to collect large numbers at small expense from overflowed lands at the substation at Bellevue.

In the summer and fall of 1899 a very peculiar disease appeared among the adult and 2-year-old brook trout in the 80-foot ponds, which resulted in the almost total loss of the younger fish and a large number of the adults. It first appeared among a lot of 2-year-old fish during the summer and gradually spread until late in the fall, the greatest loss occurring just before and during the spawning season. The symptoms varied greatly, some of the fish being attacked with inflammation of the gills, some with a slimy skin disease, some with tumorous sores, while many died without any outward sign to indicate the trouble. The majority that died, though, were affected with the sores, which seemed to originate from some internal cause, first appearing as a knotty substance under the skin and gradually enlarging and breaking out in a running sore. The sores were not confined to any particular part of the fish, but were distributed over the entire body, sometimes appearing on the head and back, and at other times on the abdomen and tail. The development of the disease was rapid, death taking place two or three days after it appeared. When the epidemic began every effort was made to check it by the liberal use of salt and clay baths, a change of food, and the transferring of the diseased fish to isolated ponds, but all remedies proved unavailing, and it continued until all the brook trout at the station were more or less affected.

It is questionable whether the disease was infectious, for, while it spread to all of the ponds, they all have independent water supplies and drains, none of the water being used more than once. In addition to this, the rainbow trout, confined in the same kind of ponds



and fed on the same food and under the same conditions, were not diseased in any way. The superintendent is unable to account for its appearance. The ponds used were 80 feet long, perfectly new, and, so far as known, the water supply is absolutely pure. As a result of this epidemic 457 adults and 4,450 2-year-old fish were lost. It appeared again during the spring of 1900 and caused the loss of 3,470 yearlings that were held for brood stock.

At the beginning of the year there were on hand 63,000 fry hatched the previous spring. Of these, 55,565 were distributed to applicants and planted in public waters during the fall, and 5,270 were held for rearing, the loss during the summer amounting to 2,165.

The stock of breeders at the commencement of the spawning season consisted of 5,250 two-year-olds and 957 adults. The first eggs were taken on November 8, and collections continued daily till January 15. From the 1,331 ripe females, 513,080 eggs were secured, an average of 385 per fish. Of this number 348,930 fry, or about 80 per cent, were hatched, and 75,000 eyed eggs were shipped to other stations. The fry were of low vitality and died in great numbers during the sac stage, only 55,800 healthy ones resulting from the season's work. Of this number, 25,000 were planted in public waters in the vicinity of the station, and 30,800 are held for distribution in the fall.

The stock of rainbow trout on July 1 consisted of 2,500 three-year-olds, 4,200 two-year-olds, and 1,900 fry. The three-year-old fish commenced to spawn on December 30 and continued until March 24, only 216 of them yielding eggs. These produced 132,225, of which 45,000 were shipped to other stations and 65,450 fry were hatched. The eggs appeared to be in good condition, the percentage of fertilization being 84, but the fry, like those of the brook trout, were of low vitality, and only 15,500 healthy ones resulted. The two-year-old fish yielded no eggs.

On the 1st of July 1,840 fry, hatched the previous winter, were on hand. Of this number 1,700 were planted in the public waters in the vicinity of the station during the fall, the loss during the summer being 140. At the beginning of the year the brood stock consisted of 45 adult fish. The spawning season extended from November 18, to December 6, resulting in the collection of 9,100 eggs. Eight thousand of these eggs were hatched, but losses during the summer reduced the number of fry to 3,000, which are now held at the station for distribution in the fall.

The grayling resulting from eggs hatched in June, 1898, were kept in ponds at the station with a loss of 626, leaving at the end of the year 824 two-year-olds, which should produce eggs next season. On the 12th of May 50,000 eggs were received from Montana in good condition, the loss on arrival amounting to only 3,100 and subsequent losses to 6,450. The fry hatched, numbering 40,450, were liberated with the exception of 5,000, which will be held.

The breeding-ponds contained large numbers of young bass in June, but during the next month natural food became so scarce that the

loss from cannibalism was large. Late in July the ponds were drawn and the fry placed in troughs, where they were fed on live maggots. Though large numbers of them died on account of weakness and insufficient nourishment while in the ponds, their improvement after being transferred to the troughs was marked. As an article of food the maggots proved far superior to anything ever used at this station. They remain alive a long time after being placed in the water, thereby attracting the notice of the young bass, which snap them up greedily. It is believed they will also prove a most economical food, as they can be produced in large quantities from the refuse of livers, at little cost. As a result of the work with this fish, 4,300 were distributed in the fall and 200 were held for brood stock.

The rock-bass work has not been as successful as was anticipated, due to low temperature of water and lack of natural food in the ponds. The construction of a new pond will permit the extension of this work, and it is believed that large numbers can be reared in the future.

At the close of the year there were on hand the following fish:

| Species.               | Calendar year in which fish were hatched. |       |       |       |       |
|------------------------|---|-------|-------|-------|-------|
|                        | 1900.                                     | 1899. | 1898. | 1897. | 1896. |
| Brook trout .....      | 30,800                                    | 1,810 |       |       | 500   |
| Rainbow trout .....    | 15,500                                    |       | 3,600 |       | 1,340 |
| Grayling .....         | 5,000                                     |       | 824   |       |       |
| Loch Leven trout ..... | 3,000                                     |       |       | 16    |       |
| Black bass .....       |   |       |       |       | 140   |
| Rock bass .....        |   |       |       |       | 58    |
| Total .....            | 54,300                                    | 1,810 | 4,424 | 16    | 2,038 |

Investigations made during the spring of 1899 indicated that large numbers of fish could be collected in the vicinity of Bellevue, Iowa, from the overflowed lands of the Mississippi River, as it is the center of a vast territory extending on the Illinois side of the river from Galena to a point 22 miles south, and on the Iowa side from Dubuque to the mouth of the Maquoketa River. Bellevue was also selected on account of the good railroad facilities and its excellent water supply. The preparatory work of fitting up a small temporary station was commenced on July 14 and completed on the 25th. The equipment consisted of four wooden retaining-tanks, 12 feet by 4 feet by 3 feet, set up on the levee in front of the city, the city council having granted permission to use the ground free of charge. The tanks were supplied with water from the city works through a half-inch galvanized-iron pipe, under pressure of 100 pounds, and escaped into the tank through a one-fourth-inch pet-cock, which reduced the volume but caused it to flow into the tank with great force, taking with it large quantities of air. The average number of gallons of water used in each tank per day was 2,000. This water was furnished at a cost of 10 cents per 1,000 gallons. A light wooden frame was constructed above the tanks, over which was stretched a canvas cover to protect the fish from strong sunlight. The daily collections were held in these tanks

until ready to be distributed. In one tank 2,500 bass, from 2 to 5 inches long, were held for ten days without loss except by cannibalism, and in the latter part of the season, when the weather was cool, 1,200 crappie, 3 inches long, were held in one tank for two weeks without loss. The tanks were kept clean, the fish assorted according to size, and no food given, and to this was attributed, to a great extent, the success met with in holding them. Of the 95,260 placed in the tanks during the season not over 100 were lost by fungus, and the loss from cannibalism was very small.

A gasoline launch 26 feet long, 4 feet beam, with 3-horsepower engine and twin screws, was purchased for \$300 and used for towing live-boxes and flatboats from the lakes to the retaining-tanks at Bellevue. The live-boxes were 5 feet by 2½ feet by 2 feet. There was also a flatboat, with a capacity for carrying 15 round-shouldered cans, which was used for transporting fish in rough weather when it would have been impossible to tow the live-boxes.

The fish were captured by means of seines, which were operated under the direction of Mr. Charles Hruby, assisted by five laborers. Operations commenced on July 25 and continued to November 10, during which time 95,260 black bass and 41,364 crappie were taken from lakes and bayous in the vicinity of Bellevue, where they would certainly have died, and were transferred by the cars to various parts of the country.

While making the collections of bass and crappie for distribution large numbers of fish, which it was impossible to hold, were liberated in the Mississippi River. As it was impracticable to count these they were handled in galvanized-iron bushel baskets, and on the counts of individual baskets it was estimated that there were thus transferred 5,000 black bass, 100,000 crappie, 5,000 pike, 8,000 yellow perch, 50,000 bream, 4,000 cat-fish, 15,000 carp, and 20,000 buffalo—a total of 207,000. This represents a very small percentage of the fish in the lakes and bayous in the vicinity of Bellevue that died when the waters dried up. There is little doubt but that the number would run up into the hundreds of thousands, if not millions.

The total cost of operating this station for the season was \$1,387.98. Of this amount \$536.51 was used for the purchase of apparatus and equipment, leaving the actual cost of collection a little over \$851.47.

The following table gives the mean temperatures of the air during the year, arranged by months. The water temperature was stationary at 50 degrees.

| Month.          | Mean<br>minimum. | Mean<br>maximum. | Mean<br>average. | Month.         | Mean<br>minimum. | Mean<br>maximum. | Mean<br>average. |
|-----------------|------------------|------------------|------------------|----------------|------------------|------------------|------------------|
| 1899.           | °F.              | °F.              | °F.              | 1900.          | °F.              | °F.              | °F.              |
| July .....      | 71               | 88               | 81               | January .....  | -3               | 42               | 27               |
| August .....    | 70               | 90               | 82               | February ..... | -2               | 37               | 19               |
| September ..... | 37               | 93               | 68               | March .....    | 3                | 52               | 33               |
| October .....   | 42               | 77               | 61               | April .....    | 29               | 74               | 57               |
| November .....  | 31               | 59               | 45               | May .....      | 52               | 83               | 68               |
| December .....  | -2               | 44               | 25               | June .....     | 65               | 86               | 76               |

## SAN MARCOS STATION, TEXAS (J. L. LEARY, SUPERINTENDENT).

During the summer a pond 1 acre in area was constructed on a triangular space lying between the roadways and the circular ponds. This was built particularly for the propagation of crappie, and receives its water supply from the current wheel through a 6-inch pipe. Concrete walks were laid around the office and artesian well, the office and buildings were painted, and 200 loads of gravel were procured for improving the bottoms of the ponds.

The weather conditions during the year were very favorable for work until January 15, when tremendous rainfalls commenced and continued until the middle of April, causing floods in many parts of the State and doing a great deal of damage. On April 7 the San Marcos River overflowed its banks, flooding the entire pond system supplied by the artesian well and causing the loss of all the black bass that were ready for distribution and a large number of brood-fish, besides destroying many nests of eggs by depositing on them a heavy coat of sediment. Over 10,000 fry had been counted out into one of the ponds for distribution, and it is estimated that the loss of fish between 2 and 3 inches long was over 50,000. Fortunately the overflow occurred during the day, and by stretching a seine across Pond H as the water receded a part of the brood stock was saved. The rainfall has been of decided advantage, though, in increasing the water supply, the well now flowing 1,000 gallons per minute. The winter was mild, the lowest temperature being 16° above zero on February 18. June 22 was the hottest day of the year, the thermometer registering 102 in the shade. The temperature of the water from the well is stationary at 73° the year round. The average temperature in the ponds is about 69°.

The methods employed in the propagation of black bass, crappie, rock bass, and bream, were practically the same as in the past, the increase in pond area permitting the utilization of additional ponds for black bass, the most important fish handled at the station. The spawning season began on February 2, seven days earlier than usual, and it was noticed that more fish used gravel for their nests than ever before. As the winter was mild the young fish grew rapidly and were large enough to be distributed by April 1, but the work had to be deferred until May on account of the freshet. As heretofore, the young bass were transferred from brood-ponds to rearing-ponds when from 1 to 1½ inches in length, the seine used for the purpose being of bobinet, 40 feet long, 5 feet deep, supplied with the usual float and lead lines. As many as 2,500 were moved at one haul of the seine.

The method of feeding is the same as in the past, chopped fish and crawfish being used to a great extent, in addition to live food. The distribution was commenced as soon after the subsiding of the water as possible, and resulted in the shipment of 110,455 bass, 5,690 rock bass, 3,195 crappie, and 300 bream, to applicants in Texas.

The calico bass, rock bass, crappie, and bream spawned as usual in

the spring, and though the brood stock was small, it is believed that considerable numbers of young fish will be available for distribution in the fall. The crappie have done particularly well, and the new pond constructed for them promises to yield a large crop. In order to keep the water of this pond stirred up 26 large carp have been kept in it, as it has been found by experience that crappie do not thrive in clear water at this station. Although much difficulty has been experienced in distributing this fish during the warm months, 125 crappie over 2 inches in length were shipped late in June and were carried for 36 hours without any loss, though the air temperature on the trip was over 100°. Ice was, of course, used for keeping the water cool.

Carp and mud shad are propagated for supplying live food for the bass and crappie, and answer the purpose well. In one of the ponds 75 adult mud shad were introduced with the bass, and from this pond 27,000 young bass were taken. Occasionally a young mud shad was captured with them, showing that the bass had eaten nearly all of them.

Salamander and shrimp continued to come up from the artesian well until the overflow in April, but since that time none have been seen. A female salamander which showed well-developed eggs was kept in a can, to see if it would produce young. It seemed to do well for 41 days, but then died without spawning. As heretofore, schools of science have been furnished with salamander and shrimp.

Very few aquatic birds have been killed during the year, showing that the warm weather carried them further south or that they are becoming less numerous. Turtles and snakes, however, are on the increase, but it is not believed that they are especially harmful to the young fish, as an examination of their stomachs showed that they consume large numbers of frogs and tadpoles, only a few fish being found.

NEOSHO STATION, MISSOURI (H. D. DEAN, SUPERINTENDENT).

The output of fish in the fall was not so large as that of the preceding year, but it is believed that the improvements now going on will enable us to increase very materially the effectiveness of this station in future. Of the rainbow trout on hand at the beginning of the year, 57,525 were distributed during the fall, and 2,500 kept for brood stock—94 per cent of the number on hand July 1. The fish were held in ponds and troughs as heretofore, and fed on a mush made of liver and shorts. The new ponds, Nos. 17 and 18, were used for spawning and proved a great convenience, the only difficulty being to give them a full supply of water when the small ponds were filled with young trout. For this reason they could not be used until the distribution was nearly over, it being December 7 before the fish were assorted and placed in them. The spawning season extended from December 13 to March 2, and though the brood-fish seemed to be in fine condition, of the 397,649 eggs collected from the older fish only 212,616, or 53 per cent, were eyed. The 2-year-old fish produced 99,048, of which 49 per cent were eyed. Assignments amounting to



99,600 were shipped to private applicants and other stations, and the balance were retained for hatching. The first of the fry made their appearance on January 2, and although the eggs had apparently been of poor quality, the fish were strong and healthy, and at the close of the year there were 97,000 on hand. The eggs from the 2-year-old trout were kept separate and hatched about the same percentage as the others, the fry from them being as strong as those from the older fish, and the losses among them no heavier.

There were no epidemics of any kind during the year and no losses of old trout except in one instance, where 425 of the 2-year-old fish were lost during the night. There is no accounting for this except on the theory that the water supply was cut off in some way in the night, though it was running in the morning:

The black-bass ponds were drawn as usual in July and the young transferred to troughs and supplied with water from pond 5. The loss during the summer was much larger than usual, and of the 15,145 placed in the troughs only 8,765, or about 58 per cent, remained in the fall when the distribution was undertaken. In the spring the brood-fish were again placed in ponds 4, 10, and 11, and though there appear to be many young fish in them, no estimate can be made as to the exact number. Several thousand, three-fourths of an inch long, were taken from pond 11 and transferred to Nos. 9 and 16, where they have grown rapidly. Observations this season seem to indicate that there is a much longer period of time between the hatching of the young bass and the absorption of the sac than has generally been supposed. It is believed at this station that it does not disappear in less than ten days and sometimes lasts two weeks.

One of the ponds which had been set aside for the rearing of strawberry bass was drawn on July 24 and 25, but owing to heat and the difficulty encountered in handling the young fish it was decided, after 5,000 had been taken out, to allow the pond to fill and leave the balance of the fish until cooler weather. On September 11 it was again drawn and 6,000 young transferred to the troughs. From all of the ponds 17,279 were taken, but the fish were so frail and so hard to feed that only 7,804 were distributed. It is noted that the young of this species are more liable to attacks of fungus than any of the other basses. The breeders were placed in ponds 3 and 7, but it has been impossible to make any observations of their spawning habits, owing to the unusual roiliness of the water; but this feature is favorable to the production of young, and it is thought there will be a good crop when the ponds are drawn in the fall. It is believed that these fish are very prolific and could be distributed in large quantities were it possible to handle them in the summer like the other basses.

It had been determined not to draw down the ponds containing the young rock bass until cool weather, but in order to supply applicants from Quincy it became necessary during a very warm spell to remove them from the pond. The results were very disappointing, as



only 12,582 were obtained as against 31,000 the previous year. From one pond that had yielded 20,000 the preceding year only 90 young fish were found. No explanation of this can be given unless it be that they were smothered by confervæ, which appeared in this pond in large quantities during the season and entirely stopped the growth of vegetation. Of the fish taken from the ponds 10,500, or 83 per cent, were successfully distributed. From observations made it is obvious that it takes fourteen days for the absorption of the sac—that is, two weeks from hatching to scattering—with a daily water temperature ranging from 62° to 75°.

Nearly 2,000 pounds of crawfish were removed from the ponds during the year and fed to the bass. No special effort has been made to exterminate them, as it is thought their value as food for the fish more than counterbalances the damage they cause to the pond banks, etc., and with proper care in drawing the ponds it is not probable that their presence is detrimental to the young fish.

The following shows the fish on hand at the end of the year:

| Species.              | Calendar year in which fish were hatched. |       |       |       |                  |
|-----------------------|---|-------|-------|-------|------------------|
|                       | 1900.                                     | 1899. | 1898. | 1897. | 1896 or earlier. |
| Rainbow trout .....   | 97,000                                    | 2,500 | 1,375 | 370   | 30               |
| Black bass .....      |   | 155   |       | 81    | 75               |
| Rock bass .....       |   | 177   |       |       | 50               |
| Strawberry bass ..... |   | 200   |       | 58    |                  |
| Golden ide .....      |   |       |       |       | 11               |
| Salmon .....          |   | 140   |       |       |                  |
| Total.....            | 97,000                                    | 3,172 | 1,375 | 509   | 166              |

LEADVILLE STATION, COLORADO (E. A. TULIAN, SUPERINTENDENT).

The brook trout on hand at the beginning of the year were kept in troughs and ponds until August, when they were distributed, with a loss of about 5,000, to applicants in Colorado.

Arrangements were made during the summer for the collection of eggs on shares from various private lakes. The brood-fish at the station commenced spawning early in October and continued until the 8th of December, 214,600 eggs being collected from them. They were of poor quality, however, and only 117,000 were eyed. Of these 45,000 were shipped and 72,000 fry were hatched. The period of incubation varied from 131 to 138 days.

The following table shows the number of brook trout eggs collected at the various points and the period of spawning:

| Point of collection.   | Spawning period.                  | No. of eggs. |
|------------------------|-----------------------------------|--------------|
| Station .....          | October, November, December ..... | 214,600      |
| Musgrove lakes .....   | do .....                          | 805,800      |
| Young's ponds .....    | October and November .....        | 496,800      |
| Ridgeway's ponds ..... | November and December .....       | 305,100      |
| Smith's ponds .....    | October and November .....        | 131,400      |
| Wellington Lake .....  | October, November, December ..... | 1,956,400    |
| Uneva Lake .....       | October and November .....        | 245,400      |
| Decker Lake .....      | November .....                    | 239,200      |
| Derry Lakes .....      | November and December .....       | 420,700      |
| Total .....            |                                   | 4,815,400    |

The take of eggs was largely in excess of the previous year, but the quality was exceedingly poor, the best being obtained at Uneva Lake, where the loss was only 10 per cent. At Smith Lake, where 131,400 were taken, it reached 44 per cent, as against a loss of 28 per cent the previous year. At Ridgeway the loss was  $77\frac{1}{2}$  per cent; at Wellington, 56 per cent; at Young's, 42 per cent; at Decker's, 80 per cent; at Musgrove's, 56 per cent, and at Derry's,  $54\frac{1}{2}$  per cent. This mortality on brook-trout eggs was greater than has ever been experienced before at the Leadville station, and is very discouraging, as the work was carried on under the same conditions as heretofore, and all of the eggs were taken by the superintendent and foreman, the greatest care being exercised in transferring them from the field stations to the hatchery. It can only be attributed to the fact that about three-fourths of the eggs were taken from young fish—as at Uneva Lake, where the fish were 3 years old and over, the loss was light. At all of the other points where collections were made the owners rear fish for market and do not care to keep them longer than two years, as they do not find a ready sale after that age.

During the winter 395,000 eyed eggs were shipped to other stations and private applicants, all of them reaching destination in excellent condition except one consignment to Bozeman. On May 1 there were on hand 1,796,650 fry, of which 760,700 belonged to the Government and the balance to the owners of the various lakes. The distribution of fry began on May 27 and by the end of June 233,000 had been planted in Colorado waters.

The Loch Leven trout on hand July 1 consisted of 180 two-year-olds and 300 fingerlings. The fingerlings all died during the year, and the others were reduced to 120 by July 1, 1900. In November 6,100 Loch Leven eggs were collected at Uneva Lake and produced 5,400 fry.

The rainbow-trout work was very unsatisfactory. Of the 18,000 fry hatched in July, 8,000 were turned over to the Lake Loveland Company, and the fry resulting from the balance, together with those derived from Twin Lakes and Sisson, California, were placed in one of the ponds at the station, and on September 1 there were 32,000 fingerlings, but by the last of June 28,000 of them had been lost. Arrangements were made in the winter for the collection of eggs from fish belonging to Mr. R. M. Ridgway, at Salida, Colo., and from this source 54,500 were secured. The eye-spots appeared within 63 days, and the fry commenced hatching in 97 days. These eggs were taken from fish 3 years of age, which had spawned for the first time this year, and though they appeared excellent when stripped the loss was very heavy, only 11,100 fry resulting from them.

In March 64,700 eggs were collected from Lake Loveland, but they were also poor. It is impossible to account for their condition unless it was caused by the unusually warm and stagnant water in the lakes the previous summer, and this theory seems untenable in view of the fact that Mr. T. H. Johnson, State fish commissioner, captured a large

number of wild rainbow trout weighing from 2 to 10 pounds each in the Gunnison River, and spawned them during April and May, and fully one-half the eggs from them were bad when taken. As the Gunnison is a cold, clear stream and quite rapid, the quality of the eggs in this instance can not be attributed to the cause mentioned above. If the eggs of other wild rainbow trout are found in this condition, it would seem that there is a limit to the usefulness of that fish in the waters of Colorado.

An effort was made in April to collect eggs from Stover Lake, about 50 miles north of Fort Collins, but when the ice melted all of the fish were dead. Numbers of them were found floating in the water. One lake near Fort Collins, which had been well stocked with black bass, was practically stripped of fish, a hole 12 feet long and 5 feet deep being found full of dead bass. The same condition was found to exist in a number of other lakes in the vicinity, and it was thought the fish had smothered under the ice. .

The lake trout on hand at the beginning of the year were carried through the year with a loss of about 43 per cent. In December 50,000 eyed eggs arrived from Northville in excellent condition, but the fry were not strong. The loss during the hatching period was only about 10 per cent, but since then the mortality has been very heavy.

During May 78,000 eyed grayling eggs arrived from Bozeman. They hatched with a loss of 21,000, and the loss of fry to June 30 was 36,000, leaving on hand at the close of the year 21,000 fingerling fish.

A consignment of 50,000 steelhead eggs arrived from the Pacific coast in May. They commenced hatching within five days, and finished with a loss of 300, or about 0.6 per cent. The loss of fry to July 1 amounted to 1,100.

From the 1,735,000 black-spotted trout eggs on hand in July 870,980 fry were hatched. The eggs collected at Grand Mesa Lake turned out very badly, about 50 per cent being lost in incubation. This was attributed principally to the fact that they were eyed at the lake on trays with such large mesh that they were liable to fall through; consequently it was necessary to cover the trays with mosquito netting, which collected a great deal of sediment. The fry were carried to October and distributed with a loss of about 50 per cent. Arrangements were again made this year to collect eggs of the black-spotted trout at Grand Mesa Lake, and by the close of the year 1,857,400 had been collected at Grand Mesa Lake and 16,000 at Freeman Lake, or a total to the close of the year of 1,873,400. These were at once transferred to the station, and appear to be of excellent quality.

SPEARFISH STATION, SOUTH DAKOTA (D. C. BOOTH, SUPERINTENDENT).

On July 3 Mr. D. C. Booth was appointed superintendent of this station, relieving Mr. H. H. Buck, who had directed the work of construction. In addition to the superintendent, the personnel consists of a fish-culturist and two laborers.

The hatchery, which was completed on July 25, is a frame building 66 feet long by 33 feet wide, with a 17 by 17 foot transept for main entrance. The first floor contains the hatching room (48 feet long by 32 feet wide), the boiler-room, reception-hall and office, and on the second floor are two bedrooms. The whole building is fitted with hot-water heating apparatus. The water supply is obtained from a series of springs rising in Amos Canyon within the hatchery grounds, and is conveyed by closed plank flumes, 700 feet long, to the hatchery.

During the summer various streams in the Black Hills, in South Dakota and eastern Wyoming, were investigated by the superintendent with the view to the establishment of auxiliary stations for the collection of brook and Loch Leven trout eggs, but judging from information so far gained it is believed the collections for a time will be somewhat limited, though there are many streams in this region which will eventually become productive if stocked with suitable fish. A permit was obtained from the governor of South Dakota for seining fish from Spearfish Creek, and within an area of 8 miles 900 brook trout and 140 Loch Levens were secured and transferred to the station ponds. Arrangements were also made with individuals to collect eggs on shares from private ponds. A temporary retaining-pond was constructed on Sand Creek, about 7 miles from Beulah, Wyo., in the Black Hills, and 3,000 adult trout, averaging 10 inches in length, were collected. These commenced to spawn on November 15, and by January 20 the 1,100 females had yielded 374,000 eggs.

From all sources in South Dakota and Wyoming 581,000 brook trout and 41,500 Loch Leven trout eggs were obtained, and 100,000 brook-trout eggs were shipped from Leadville. Of those obtained at Sand Creek 50,000 were sent to the Wyoming Fish Commission and to an applicant in Idaho; the balance were hatched with comparatively light losses and yielded 300,000 fry, or 93 per cent of the eggs reserved. As a result of the season's work, 579,568 brook-trout fry were hatched, 85,145 were lost during the sac stage, 87,423 were given to the owners of stock fish from private ponds, and 123,000 distributed, leaving on hand at the close of the year 284,000. A consignment of 100,000 black-spotted trout eggs, shipped from the Leadville station in July, hatched the following month with a loss of 18,240. The fry were held in troughs at the station during the winter, but the losses were very heavy, and when distributed in the spring only 20,260 of them remained; 15,000 of these were planted in May and June.

The superintendent made a trip through northern Wyoming in April with the view to establishing an auxiliary station for the collection of black-spotted trout eggs, and after several days of investigation along the Big Horn Mountains, Tongue River was decided upon as the most feasible field for operations. An egg-eying station was accordingly erected near Dayton, Wyo., early in May, and by the close of the year several hundred adults had been collected and a few thousand eggs secured, but the outlook was very unfavorable on account of the

immense quantities of snow on the mountains, which not only retarded the spawning season, but raised the streams to such an extent as to practically stop work. Permission has been obtained from Mr. S. H. Campbell, of the Wyoming Fish Commission, to operate next season for brook trout in the vicinity of Laramie, where there are a number of good streams.

The Loch Leven trout eggs collected during the fall hatched in the spring with a loss of only 2,450. The owner of the pond was given 8,000, and at the close of the year there were 27,000 on hand.

The following table shows the stock at the station on June 30:

| Species.                  | Calendar year in which fish were hatched. |       |       |       |
|---------------------------|---|-------|-------|-------|
|                           | 1900.                                     | 1899. | 1897. | 1896. |
| Brook trout.....          | 284,000                                   | ----- | 300   | 600   |
| Loch Leven trout .....    | 27,000                                    | ----- | 40    | 100   |
| Black-spotted trout ..... | 5,000                                     | 5,260 | 154   | ----- |
| Total .....               | 316,000                                   | 5,260 | 494   | 700   |

BOZEMAN STATION, MONTANA (JAMES A. HENSHALL, SUPERINTENDENT).

The freshet which occurred in June prevented the use of the creek water for the grayling fry, and as many were dying in the hatching-troughs, which are supplied by spring water of a low temperature, 300,000 were planted in Bridger Creek early in July. By the time the rest of the fry were hatched the ponds were again supplied with the creek water and they thrived well in it, though the losses from cannibalism were heavy. It would seem from the experience at this station that the methods used in hatching and rearing trout are not entirely applicable to the grayling. The fry can not be retained in troughs supplied by cold spring water, as trout are. This is probably because trout when first hatched have a large yolk-sac, which supplies them with nourishment for a month or more, and by that time they are able to take artificial food. The yolk-sac of the grayling is quite small and is absorbed in a few days, consequently the fry have but little strength when they begin to swim and are apparently incapable of taking artificial food, and as there is little or no natural food in spring water, it is imperative that they be transferred to water containing it. This food can easily be seen with the naked eye. In holding a glassful to the light hundreds of small crustaceans (Entomostraca), resembling specks of dust, can be seen floating in the water. Another reason why the fry of the grayling should be transferred at an early stage to creek water is that they may get plenty of sunlight, as they have been observed to be partial to the sunny parts of the water. Within a week or two after the absorption of the sac the fry learn to take finely chopped liver very readily.

Operations at Red Rock commenced much earlier than ever before, collections of grayling eggs extending from April 30 to June 1. Mr. G. H. Tolbert, who had charge of the work, secured 3,687,000; of



these, 119,500 were lost in incubation, 1,625,000 were transferred to Bozeman, and the balance, 1,942,000, were hatched and distributed in the vicinity. The eggs were eyed in white-fish hatching-jars, and were then transferred to troughs and hatched like trout. The shipments, many of which were to distant points, reached their destination in excellent condition. This was attributed chiefly to the use of a new shipping-case, devised at the station the previous winter. The outside of this case is of the usual form, 30 inches square, from 12 to 18 inches deep, and fitted with hinges, hinged hasps, and staples, in order to allow ready access for re-icing en route. An inner case of half-inch stuff, of the same depth as the outer case, but without top or bottom and about 26 inches square, fits into the outer case, the space between the two being packed with dry sphagnum-moss or sawdust. The egg trays are 12 inches square outside and  $1\frac{1}{2}$  inches deep, and as it has proven impracticable to place moss over the eggs, the only covering is a piece of mosquito netting on each tray. The stack of trays is placed in the center of the space in the case, which is then filled in with broken ice. On the top of the trays is a hopper of the same size with perpendicular sides filled with ice, which allows ready access to the ice chamber. On the outside is a notice to the express messenger that the contents are perishable and must be re-iced en route. No difficulty has so far been experienced in sending eggs to any part of the United States in this form of case. In every instance they have arrived in good condition, with a temperature of  $40^{\circ}$  or less.

The black-spotted trout eggs on hand at the first of the year were hatched in July, and the fry resulting from them were distributed in September and October in the States of Montana, Oregon, Idaho, and Washington, the output amounting to 277,000. The season at Henry Lake was about a month in advance of the usual time. The first eggs were taken on April 2, the last on June 5, the total collections being 1,441,000. The work at this point was directed by Mr. W. F. Jarvis, and was satisfactory except for the heavy loss of eggs during incubation, which was due to the fact that sufficient help could not be secured to pick out the dead ones. The losses in hatching were 398,500. During June 923,000 were transferred to Bozeman and 120,000 were hatched and distributed in Henry Lake and vicinity.

In the summer of 1897 a number of steelhead trout escaped from the ponds into Bridger Creek, which flows through the station grounds, and as a result some 200 steelheads this year entered the waste ditch from the creek and 52,000 eggs were secured from them and hatched with little loss, producing fine healthy fry. The fish from which they were taken were scarcely three years old, from 12 to 20 inches long, but were much larger than those of the same age that are confined in ponds at the station and which did not spawn this season.

The brook-trout fry on hand at the beginning of the year were distributed with the other fingerlings in the fall, having been carried through the summer with comparatively light losses.



In November 60,000 eggs were collected from the two-year-old trout reared at the station, and two consignments, comprising 100,000, were shipped from Leadville. The first of these arrived in fair condition, but the last were of poor quality and the losses consequently heavy.

At the close of the year there were on hand the following fish:

| Species.                 | Calendar year in which fish were hatched. |       |       |       |
|--------------------------|---|-------|-------|-------|
|                          | 1900.                                     | 1899. | 1898. | 1897. |
| Brook trout .....        | 128,000                                   | ----- | 1,750 | 932   |
| Black-spotted trout..... | 800,000                                   | ----- | 4,700 | 133   |
| Steelhead trout.....     | 44,000                                    | ----- | 170   | 5,945 |
| Rainbow trout.....       | -----                                     | 1,550 | ----- | ----- |
| Grayling .....           | 700,000                                   | 50    | ----- | ----- |
| Total .....              | 1,672,000                                 | 1,600 | 6,620 | 7,010 |

BAIRD STATION, CALIFORNIA (G. H. LAMBSON, SUPERINTENDENT).

During June the racks were put in by the regular employees of the station, but it was noted that the number of salmon in the pool was much smaller than in past years. The equipment for the new hatchery, which had been completed just before the close of the fiscal year, was installed during the summer and consists of 86 troughs, arranged in sections of eight, so that the water from each gate of the supply-trough passes through four troughs of eggs, with a fall of about 9 inches. The upper troughs are 52 inches above the floor and are provided with platforms for the pickers to stand on; the lower troughs are 20 inches above the floor. The troughs are 15 feet 6½ inches long, 15¾ inches wide, and 7½ inches deep, inside measurement, and are equipped with 6 baskets each, 24 inches long, 15 inches wide, and 6¾ inches deep. These baskets are of galvanized-wire cloth, 5 wires to the inch, ¾-inch mesh, and are substantially made, the corners being soldered to an L strip of galvanized sheet iron extending seven-sixteenths of an inch on each side, and the wire cloth attached at the top to the wooden frame by double-pointed tacks. The compartments in which they are placed are 25 inches long and are separated by pairs of steel plates placed 1½ inches apart. The first division plate is 12 inches from the upper end of the trough and the lowest division 14 inches from the lower end. The troughs are fastened together in pairs by two iron braces made of ½-inch by 1-inch iron, which extend across the bottom and up the sides in the shape of a double L, and are attached by screws. This arrangement leaves the top of the trough open, with no braces in sight, and, moreover, allows the baskets to be shifted without being lifted from the water.

The water supply for the station, which had been very unsatisfactory in the past two years, was increased by the installation of a No. 4 Byron Jackson centrifugal pump, geared to supply about 450 gallons per minute. The power for operating this pump is furnished by an undershot water-wheel, designed by Mr. Leroy Ledgerwood, one of the regular laborers at the station. It is 13 feet long with a radius

of 6 feet  $1\frac{1}{2}$  inches, with 18 paddles 19 inches wide. It runs on a  $3\frac{1}{2}$ -inch shaft, and makes about 6 revolutions per minute when driving the pump. The power is conveyed by an 8-segment gear of 184 teeth bolted to the framework of the wheel and driving a 24-tooth pinion, to the shaft of which is keyed the main driving-pulley,  $6\frac{1}{4}$  feet in diameter. The pump is operated by a 7-inch pulley, driven by an 8-inch rubber belt 80 feet long. This wheel is so built on its supporting frames that by means of a tackle it can be raised or lowered to meet the exigencies of rising or falling waters in the river, as at certain heights of water it becomes impossible to use the water-wheel. To meet such emergencies a steam pumping-plant was installed, capable of furnishing 300 to 400 gallons of water per minute. This plant consists of a Blake special duplex pump, operated by a 15-horsepower Atlas locomotive boiler, and is set about 17 feet above the river at extreme high-water level. It is operated when the regular supply is disabled, and has proved very satisfactory. A suitable building with corrugated-iron roof was erected over this plant.

Fish-cultural work commenced August 21 and continued steadily until September 27, when the summer run was over. The fall run commenced October 18 and continued until November 9. During the first run 14,017 females and 8,047 males were captured in the 353 seine-hauls made; of these, 914 males and 1,222 females were placed in the spawning-pens. From the trap, which is located in the upper rack, 108 females were secured and 34 were taken with a dip net. The total number of fish handled does not indicate the real number in the pool, as it is customary to count them as often as they are caught. There were, perhaps, between 3,000 and 4,000 fish in the pool during the summer run, though not over a third of that number were in the pool at one time. The fall run was very irregular, and only 173 fish were captured; of these, 101 females were placed in the pound.

The seining is done in the pool between the upper and lower racks, and is carried on daily from 5 to 10 a. m. and from 5 to 10 p. m. The seine is run out in a flat-bottomed boat and hauled in by a windlass, operated by two men and a one-horse whim. While operating the seine at night it is necessary to keep a fire on the bank for warmth and light, and lanterns are hung up around the fishing-grounds to enable the men to examine the fish as they are captured.

Many fish are necessarily held in the pool for eight or ten weeks, and it has been noticed that there is a decided difference in the condition of the ripe fish, some being dark, with fins frayed, noses bitten, and of a generally dilapidated appearance, while others are bright, silvery, plump, and pliable. The former are those that have been in the pool for a long time, the latter are fresh-run fish. It is much more difficult to take eggs from the old-run fish, but no experiments have been conducted to determine whether they are actually inferior to the eggs from fresh-run fish.

The methods of taking the eggs are the same as heretofore. After

the fish are stripped the females are knocked on the head and given to the Indians for winter stores, though a few were put up by the white residents during the past season. The males are returned to the river unless there is a scarcity, when they are retained in the pound to be used again, as one male will frequently furnish milt for several pans of eggs.

From the summer run 6,228,260 eggs were secured; from the fall run 186,800, a total of 6,415,060. The summer run averaged 4,896 per fish; the fall run 5,494. After the eggs are taken to the hatchery they are measured and put in baskets, 40,000 to the basket. As the eggs were much smaller this year than heretofore, it was discovered later in the season that the first 72 baskets filled contained 48,800 each.

As soon as the water is turned on the baskets are covered and the dead eggs are picked out every other day until they reach the critical stage, which is usually the fourth or fifth day at this station. They are then left undisturbed until the day after the closing of the blastopore, which usually occurs about the eleventh or twelfth day. At that time they are uncovered and washed without lifting the baskets from the water, which is done by removing the division plates, and after that are picked daily until all dead eggs have been removed.

When the eggs were from 25 to 28 days old 1,000,000 were shipped to the California Fish Commission station on Eel River, and 1,905,000 to the Sisson hatchery. The remainder, with 1,224,000 from Battle Creek, were hatched at the station. Of the eggs taken during the summer run 1,115,000 were lost during incubation and from the fall run 11,880, making a total of 1,126,880, or 17.9 per cent loss on the eggs taken at Baird. Of those transferred from Battle Creek 24,400, or 1.9 per cent, were lost.

Very unfavorable reports were received from the California Fish Commission as to the condition of the eggs sent to Sisson. The shells seemed to be spotted by a thinning of the membrane, and this was followed later by its rupture and consequent death of the aborted fry. The superintendent, accompanied by Mr. Wallich, the foreman at Baird, examined the eggs at Sisson and found the disease present, though not to so great an extent as had been reported. It is believed by the California Commission that it was due to fungus, but as the eggs at Baird during the season had been exceptionally free from this disease, the superintendent was unable to concur in this opinion. Later Mr. Cloudsley Rutter, of the Division of Scientific Inquiry, was detailed to examine into the trouble, but not arriving at Baird until the affected eggs had hatched and most of the fry had been planted, he was unable to make as thorough investigation as was desired. This is not the first appearance of this disease. It has been observed several years previously, but no systematic study involving an examination of the parent fish, eggs, and fry has ever been made, nor has there been any attempt to cultivate the bacteria and determine its

exact nature. The majority of the eggs retained at the station were taken from the first run and commenced to hatch on September 27. They finished on October 27, the yield amounting to 2,208,260.

The eggs from the fall run and from Battle Creek were hatched in October and November, and yielded, respectively, 174,920 and 1,187,050. The loss of fry during the sac stage was comparatively small, amounting to 49,130, or 3.6 per cent of the total fry hatched. Several days before the eggs commence to hatch at this station the baskets are placed in clean troughs, two to each trough, where they remain until all have hatched except a few hundred. The baskets are then transferred to the last section of the trough, as these eggs produce a large percentage of deformed fry. This was particularly noticeable in the eggs from Battle Creek; in some cases both the caudal fin and the caudal vertebræ were apparently lacking. During the process of hatching the baskets are shaken up twice a day to sift the fry through and prevent their smothering. The fry are cleaned daily, but the troughs can not be thoroughly scrubbed until the hatching is completed. Upon the removal of the baskets the troughs are given a good scrubbing and the operation is repeated twice a week until they are planted.

Early in the season the eggs retained for hatching seemed to show an unusual mortality late in their development, but the measurement of losses did not reveal anything to cause alarm. A considerable mortality occurred in the alevins after they were somewhat advanced in development, but in most instances the losses seemed to be individually selective. The victims showed no preliminary affection, and were usually taken from the oldest, strongest, and best lots of fry. As this loss was not due to the fish smothering, it was believed that the depth of water in the troughs might be too great; consequently it was lowered from 6 to 4 inches in another line of troughs, but the results were identically the same. A mud bath was also tried without effect. The greatest loss occurred among the scattered baskets of eggs, which had been retained at the station on account of extraordinary losses upon first picking. This would seem to point to the cause as antedating the taking of the eggs from the fish.

The following table shows the daily take of eggs, eggs lost, and mean temperature of water:

*Table showing daily take of eggs, eggs lost, etc., at Baird Station.*

| Date.            | Females stripped. | Eggs taken. | Eggs lost. | Mean water temperature. | Date.            | Females stripped. | Eggs taken. | Eggs lost. | Mean water temperature. |
|------------------|-------------------|-------------|------------|-------------------------|------------------|-------------------|-------------|------------|-------------------------|
| 1899.<br>Aug. 21 |                   |             |            | 55                      | 1899.<br>Aug. 29 | 20                | 102,200     | 350        | 55                      |
| 22               | 32                | 175,000     |            | 54                      | 30               | 21                | 106,000     | 275        | 55                      |
| 23               | 25                | 117,900     | 600        | 54                      | 31               | 31                | 155,400     | 200        | 55                      |
| 24               | 13                | 80,200      | 60         | 54                      | Sept. 1          | 40                | 206,594     | 4,400      | 54½                     |
| 25               | 14                | 80,200      | 900        | 55                      | 2                | 40                | 205,455     | 4,100      | 53                      |
| 26               |                   |             | 1,200      | 55                      | 3                | 50                | 218,043     | 9,900      | 53                      |
| 27               | 28                | 151,000     | 200        | 55                      | 4                | 45                | 209,855     | 4,000      | 53½                     |
| 28               | 24                | 116,500     | 90         | 55                      | 5                | 53                | 254,343     | 11,000     | 52½                     |

Table showing the daily take of eggs, eggs lost, etc.—Continued.

| Date.   | Females stripped. | Eggs taken. | Eggs lost. | Mean water temperature. | Date.   | Females stripped. | Eggs taken. | Eggs lost. | Mean water temperature. |
|---------|-------------------|-------------|------------|-------------------------|---------|-------------------|-------------|------------|-------------------------|
| 1899.   |                   |             |            |                         | 1899.   |                   |             |            |                         |
| Sept. 6 | 32                | 154,376     | 4,000      | 52½                     | Nov. 21 |                   |             | 350        | 52                      |
| 7       | 54                | 275,978     | 9,400      | 53½                     | 22      |                   |             | 125        | 53                      |
| 8       | 72                | 335,620     | 7,900      | 53½                     | 23      |                   |             | 525        | 49                      |
| 9       | 40                | 206,000     | 8,500      | 54                      | 24      |                   |             | 500        | 50½                     |
| 10      | 69                | 344,422     | 8,700      | 54½                     | 25      |                   |             | 150        | 51½                     |
| 11      | 73                | 345,054     | 10,300     | 54                      | 26      |                   |             | 250        | 52                      |
| 12      | 90                | 432,600     | 14,900     | 54½                     | 27      |                   |             | 150        | 52                      |
| 13      | 78                | 357,100     | 15,600     | 55                      | 28      |                   |             | 100        | 54½                     |
| 14      | 51                | 254,700     | 19,300     | 53½                     | 29      |                   |             | 600        | 53                      |
| 15      | 37                | 176,500     | 13,800     | 54                      | 30      |                   |             | 450        | 52                      |
| 16      | 36                | 173,200     | 15,600     | 53½                     | Dec. 1  |                   |             | 350        | 50                      |
| 17      | 39                | 180,700     | 15,000     | 53½                     | 2       |                   |             |            | 51                      |
| 18      | 36                | 168,300     | 21,500     | 54                      | 3       |                   |             |            | 50                      |
| 19      | 36                | 179,100     | 24,300     | 53½                     | 4       |                   |             | 750        | 48                      |
| 20      | 35                | 174,850     | 20,700     | 53½                     | 5       |                   |             |            | 47½                     |
| 21      | 20                | 92,650      | 19,600     | 53                      | 6       |                   |             |            | 46½                     |
| 22      |                   |             | 22,000     | 53                      | 7       |                   |             | 225        | 47½                     |
| 23      | 24                | 120,000     | 22,300     | 53                      | 8       |                   |             | 200        | 49½                     |
| 24      |                   |             | 20,700     | 53                      | 9       |                   |             |            | 45½                     |
| 25      | 8                 | 48,250      | 26,700     | 52½                     | 10      |                   |             | 350        | 47½                     |
| 26      |                   |             | 20,700     | 52½                     | 11      |                   |             |            | 49                      |
| 27      | 6                 | 30,250      | 18,400     | 52½                     | 12      |                   |             | 300        | 49                      |
| 28      |                   |             | 26,500     | 52½                     | 13      |                   |             |            | 45                      |
| 29      |                   |             | 34,500     | 52½                     | 14      |                   |             | 310        | 43                      |
| 30      |                   |             | 42,700     | 52½                     | 15      |                   |             |            | 47                      |
| Oct. 1  |                   |             | 32,000     | 50½                     | 16      |                   |             | 175        | 49                      |
| 2       |                   |             | 27,600     | 49½                     | 17      |                   |             |            | 48½                     |
| 3       |                   |             | 36,000     | 50                      | 18      |                   |             |            | 45                      |
| 4       |                   |             | 73,700     | 50                      | 19      |                   |             | 300        | 45½                     |
| 5       |                   |             | 33,000     | 49½                     | 20      |                   |             |            | 46                      |
| 6       |                   |             | 92,000     | 49½                     | 21      |                   |             |            | 48½                     |
| 7       |                   |             | 20,700     | 50½                     | 22      |                   |             | 200        | 48½                     |
| 8       |                   |             | 27,000     | 51½                     | 23      |                   |             |            | 49½                     |
| 9       |                   |             | 59,900     | 50½                     | 24      |                   |             | 470        | 49                      |
| 10      |                   |             | 46,000     | 49                      | 25      |                   |             |            | 47                      |
| 11      |                   |             | 59,000     | 46½                     | 26      |                   |             |            | 47                      |
| 12      |                   |             | 55,000     | 46                      | 27      |                   |             | 325        | 47                      |
| 13      |                   |             | 16,000     | 45½                     | 28      |                   |             |            | 44½                     |
| 14      |                   |             | 8,000      | 47                      | 29      |                   |             | 525        | 44                      |
| 15      |                   |             |            | 46½                     | 30      |                   |             |            | 46½                     |
| 16      |                   |             | 8,800      | 46½                     | 31      |                   |             |            | 49                      |
| 17      |                   |             | 6,600      | 48½                     | 1900.   |                   |             |            |                         |
| 18      | 3                 |             | 4,000      | 49                      | Jan. 1  |                   |             |            | 50                      |
| 19      |                   | 18,000      |            | 52                      | 2       |                   |             |            | 51                      |
| 20      | 3                 |             |            | 50                      | 3       |                   |             |            | 52                      |
| 21      | 2                 | 17,550      |            | 50                      | 4       |                   |             |            | 52                      |
| 22      |                   | 11,100      | 4,000      | 49                      | 5       |                   |             |            | 51                      |
| 23      |                   |             | 2,000      | 48                      | 6       |                   |             |            | 54                      |
| 24      |                   |             | 2,400      | 47                      | 7       |                   |             |            | 52                      |
| 25      |                   |             |            | 47                      | 8       |                   |             |            | 48                      |
| 26      |                   |             |            | 47                      | 9       |                   |             |            | 49                      |
| 27      |                   |             | 525        | 47                      | 10      |                   |             |            | 50                      |
| 28      |                   |             |            | 47                      | 11      |                   |             |            | 50                      |
| 29      |                   |             |            | 46                      | 12      |                   |             |            | 52                      |
| 30      | 1                 | 4,600       |            | 47                      | 13      |                   |             |            | 50                      |
| 31      | 4                 | 27,200      |            | 48                      | 14      |                   |             |            | 50                      |
| Nov. 1  | 1                 | 6,800       |            | 47                      | 15      |                   |             |            | 51                      |
| 2       |                   |             |            | 46                      | 16      |                   |             |            | 51                      |
| 3       |                   |             |            | 46                      | 17      |                   |             |            | 52                      |
| 4       | 8                 | 40,800      |            | 48                      | 18      |                   |             |            | 51                      |
| 5       |                   |             |            | 48                      | 19      |                   |             |            | 49                      |
| 6       | 6                 | 28,050      |            | 47                      | 20      |                   |             |            | 49                      |
| 7       |                   |             | 100        | 48                      | 21      |                   |             |            | 49                      |
| 8       |                   |             | 40         | 48                      | 22      |                   |             |            | 48                      |
| 9       | 6                 | 32,700      | 21         | 49                      | 23      |                   |             |            | 49                      |
| 10      |                   |             |            | 53                      | 24      |                   |             |            | 48                      |
| 11      |                   |             | 101        | 55                      | 25      |                   |             |            | 47                      |
| 12      |                   |             |            | 55                      | 26      |                   |             |            | 47                      |
| 13      |                   |             | 128        | 56                      | 27      |                   |             |            | 48                      |
| 14      |                   |             | 150        | 53                      | 28      |                   |             |            | 48                      |
| 15      |                   |             | 150        | 54                      | 29      |                   |             |            | 50                      |
| 16      |                   |             |            | 51                      | 30      |                   |             |            | 48                      |
| 17      |                   |             | 1,200      | 50                      | 31      |                   |             |            | 51                      |
| 18      |                   |             | 1,350      | 52                      |         |                   |             |            |                         |
| 19      |                   |             | 360        | 53                      | Total   | 1,306             | 6,415,140   | 1,126,880  |                         |
| 20      |                   |             | 600        | 50                      |         |                   |             |            |                         |



The total of fry lost during the season was 36,280.

The following is a summary of fishing operations:

| Month.          | Seine hauls. | Trap hauls. | Males taken. | Females taken. | Total taken. | Ripe females im-pounded. | Ripe females stripped. | Percent-age of females ripe. | Ripe males stripped. |
|-----------------|--------------|-------------|--------------|----------------|--------------|--------------------------|------------------------|------------------------------|----------------------|
| 1899.           |              |             |              |                |              |                          |                        |                              |                      |
| August .....    | 87           | 3           | 3,692        | 6,474          | 10,166       | 224                      | 208                    | 34                           | 133                  |
| September ..... | 266          | 25          | 4,425        | 7,736          | 12,161       | 1,142                    | 1,064                  | 14                           | 886                  |
| October .....   | 10           | 4           | 45           | 42             | 87           | 13                       | 13                     | 31                           | 11                   |
| November .....  | 11           | 4           | 58           | 59             | 117          | 21                       | 21                     | 35                           | 15                   |
| Total .....     | 374          | 36          | 8,220        | 14,311         | 22,531       | 1,400                    | 1,306                  | -----                        | 1,045                |

BATTLE CREEK, CALIFORNIA (G. H. LAMBSON, SUPERINTENDENT).

The station remained in charge of a watchman until September 10, when work was regularly installed by the superintendent, Mr. W. B. Hunt, an employee of the California Commission, being put in charge of the hatchery and Mr. A. P. Smiley in charge of work on racks, ditches, etc. The main rack was commenced at once and was completed so that no salmon could ascend the stream by September 15, when the energies of the men were directed to completing racks 2 and 3, clearing the seining-grounds between the racks, cleaning out the water-supply ditch, and placing the hatchery apparatus in condition for work.

On October 1, when the first salmon appeared, the water in the Sacramento River was so low that very few fish entered Battle Creek. On October 11 a heavy rainfall raised the creek and brought down a large amount of trash, but only a few salmon were brought up by the rise. Rains continued, and on October 19 racks 2 and 3 had been damaged, No. 3 being partially carried away, but the main rack was uninjured. On October 26 the first haul of the seine was made and about 60 fish secured. Of the 18 females included in this catch only 1 was ripe.

Regular seining commenced on October 28 with a crew of 7 men, and continued to November 18, on which date only 24 fish were secured in 6 hauls of the seine. This season the seine was hauled at intervals of 40 to 60 minutes for about 10 hours during the day, though in previous years when fish were plentiful it has been customary to employ two crews and keep the seine going continuously night and day. When working at night two locomotive headlights are used to illuminate the grounds, and fires are maintained on the banks for the comfort of the workmen.

The season proved a total failure. Only 3,258 fish were captured, and of these 255 yielded 1,420,500 eggs, an average of 4,984 per fish. The usual methods were employed in taking eggs. All eggs were transferred to the hatchery, where they were eyed, 1,224,000 being shipped to Baird and 20,000 to France.

On December 18 the remaining temporary employees were discharged and the regular men transferred to Baird, the property being



left in charge of a watchman. As usual, the adult fish were given to residents in the vicinity of the station, who came in large numbers from 50 miles around for them.

CLACKAMAS STATION, OREGON (S. W. DOWNING IN CHARGE).

Mr. W. F. Hubbard, who had been in charge of this station since its acquisition by the Government, was transferred to Nashua on July 1, and the station left in charge of Mr. J. N. Wisner, field superintendent until July 10, when it was turned over to Mr. S. W. Downing, who had been appointed to the vacancy. The construction of the rack across the Clackamas River, a short distance above the station, was undertaken at once and finished July 25. As the water supply had been very unsatisfactory for a number of years a well was sunk to a depth of about 20 feet near the hatchery, 4 feet below the level of the low-water mark of the Clackamas River, and as the land formation at that depth is of coarse gravel, an abundant supply of water was secured. The water was very clear, of even temperature, and proved of excellent quality for hatching purposes. During the summer the seining-grounds below the rack were cleared and a number of other improvements made.

Operations commenced on September 13, but no ripe fish were taken until the 15th. As there were very few fish below the rack, an agreement was entered into with G. H. Oldenburg to furnish eyed eggs at 40 cents per 1,000, and 775,000 were secured in this way. The fishing at the station resulted in the collection of 619,900, and 620,000 were transferred from the Salmon River, which was being operated by the State Fish Commission. In November 2,436,000 more were received from the Little White Salmon, making a total of 4,450,900 handled during the season. The fry resulting from these, 4,371,422, were liberated in the Clackamas River and Clear Creek, over an area of about 10 miles above and below the station, except 250,000, which were held in troughs and fed until they were four months old, when all were liberated except 2,000 retained for further experiment. On February 25 the fingerlings that were being fed were attacked by fungus, the dorsal and pectoral fins turning white and little white spots appearing on different parts of the body. Salt was applied by drawing the water in the trough down low and then adding a pailful of strong brine. The fry were allowed to remain in this until they showed signs of distress, when fresh water was again turned on. After several such treatments the disease disappeared. The well water was used until November 30, when the water from the spring was turned on. The spring water had been tried early in the season when the eggs were received from the Salmon River, but on account of its high temperature they commenced dying within a few hours after being placed in it.

With the view to getting additional data relative to the number of salmon that return to the streams in which they are liberated, efforts

were made in June to tag the fry that had been held, but although the greatest care was exercised, all the fish experimented with died in a few days. Twenty-four of them were tagged through the mouth, but with the same result. The difficulty in marking such small fish lies in the liability of injury to the scales and fins. Every fish, though handled very carefully with a soft linen cloth, showed white spots or finger marks within 5 minutes after being returned to the water, and on the following day they were covered with fungus.

Experiments were also tried to determine how many eggs are left in a salmon after being stripped by the usual process, and as to the practicability of taking these through an opening in the abdomen. The abdomen was opened and all of the eggs found in the ovaries were washed free of blood and milt applied, but the eggs were of no value. At the Rogue River station, however, very good results were secured, 35,800 of the 53,200 eggs taken being successfully eyed. At that point, in order to avoid possible injury to the eggs by washing, Mr. Berrian bled the fish by cutting off their tails before placing them in the spawning-box. The fry hatched from them appeared to be as healthy and strong as the others, and it was decided that from 400 to 500 eggs per fish could in this manner be saved.

Besides the quinnat-salmon eggs handled here, 150,000 eggs of the silver salmon were received from the Rogue River in January, from which 146,000 fry were hatched and liberated in the Clackamas. One hundred thousand lake-trout eggs shipped from Northville produced 88,000 fry, which were held until March, and then planted in suitable lakes in the State of Washington. Two shipments of white-fish eggs, aggregating 1,000,000, were also received from this station. The first proved a total loss, having been 8 days en route; the other yielded 160,000 fry, which were liberated in Lake Washington, King County, Wash. From the 25,000 rainbow-trout eggs received from the California Fish Commission 22,000 fry were distributed in Meachum, Pearson, and McKay creeks, all tributaries of the Columbia River, near Pendleton, Oreg., at the request of the Oregon Fish Protective Association. On the last of May 144,000 steelhead eggs were transferred from the Rogue River and produced 124,000 fry.

From Bozeman 50,000 grayling eggs were received, which produced 41,000 fry.

On May 7 Mr. Downing was transferred to the superintendency of the Put-in Bay station and was succeeded by Mr. E. N. Carter.

#### ROGUE RIVER STATION, OREGON.

As the State Fish Commission had decided to operate the Upper Clackamas and Salmon River stations, the superintendent visited Rogue River with Mr. R. D. Hume late in July and arranged to reopen the station there. Large numbers of salmon were to be seen jumping, and to prevent their further ascent a rack was immediately placed across the river. Fishing commenced during the latter part

of August and continued steadily to October 19, when the rack was carried away by high water and all the fish escaped.

The indications are that Rogue River will prove a valuable field for salmon work. There is no doubt but that double as many eggs would have been collected this season had not the rack been carried away. The day it was swept out 264,800 eggs were collected and there were numbers of green fish in the pool. The water of this stream is of the very best quality for hatching operations, the highest temperature recorded being 53°. The following illustrates what may be accomplished in water of this character: A basket containing 8,000 eggs was placed in a trough in the river and left undisturbed for 21 days, when they were found to be perfectly eyed, and only 80 dead ones were picked out; a total loss of 1 per cent.

The take for the season was 4,364,800, of which 1,800,000 were sent to Mr. Hume's hatchery at Wedderburn, Oreg., near the mouth of the Rogue River. The first shipment of 800,000, although two weeks en route and hauled about 100 miles over a wagon road, reached destination with a loss of only about 10 per cent; the second lot carried much better, the loss being only about 1 per cent. They were hatched at Wedderburn and the fry held until they were 3 or 4 inches long, being fed entirely on canned salmon. They were then liberated in the Rogue and its tributaries. The balance of the eggs were hatched at the station, producing 2,156,000 fry, which were liberated in Elk Creek and Rogue River.

Efforts were also made to collect silver-salmon eggs. A rack was placed across Elk Creek on November 19, and on the 27th, when it was carried away by a freshet, 200,000 eggs had been secured. They were of fair quality, and 150,000 of them were eyed, but as the hatchery was overcrowded with quinnat salmon they were shipped to Clackamas.

As numbers of steelhead trout had been observed in Elk Creek it was decided to establish an auxiliary station on that stream, and a point about 10 miles above the station, known as Elk Creek Falls, was selected. Here the stream forks at almost right angles, the falls being in the east branch. By February 1 an effectual barrier to the ascent of the fish up the west branch had been completed in the form of a solid log dam a short distance from the base of the falls, thus compelling the fish to ascend the east branch. A heavy log was then placed across the creek at the upper edge of the falls and pinned to the bed-rock, forming so sudden an ascent that the fish were unable to jump over it. A deep natural channel, with almost level bottom, about halfway up the falls formed an excellent place for a trap, and here the greater portion of the fish were secured. Many fish were also captured on the north side of the falls, where a channel 40 feet long, 2 feet deep, and 4 feet wide was blasted in the solid rock. A small shed 15 by 38 feet, without sides, was erected, and two hatching-troughs set up, the water supply being conveyed to them by means of

a ditch and 100 feet of flume. The first eggs were secured March 7, and the season closed May 11, with a total take of 530,000. Of these 315,000 were shipped to various points in the United States, 70,000 were lost in incubation, and the balance transferred to Clackamas on May 24, when the Elk Creek Falls station was closed.

LITTLE WHITE SALMON STATION, OREGON (J. N. WISNER, SUPERINTENDENT).

The station was opened August 5 and preparations at once commenced for the capture of quinnat salmon. The channel of the river was found blocked by a mass of débris, caused by the lumber company fluming lumber down to the Columbia River. On September 2, after much correspondence and several interviews, the company was induced to discontinue operations, so that in a few days salmon began to appear in the river, and on the 10th fishing was commenced. The daily catch increased steadily until September 25, when the number seemed to have reached its maximum. On that date 1,025,000 eggs were secured, the largest take of the season.

The fish are captured by means of a downstream trap, which consists of a box about 20 feet long by 8 feet wide and 18 inches deep, made of slats placed 2 inches apart, anchored in midstream. The end of the trap pointing upstream is weighted to the bottom of the river and a dam or rack extends from its two sides to within a few feet of either bank. The fish ascending the stream pass around the rack to the spawning-grounds above, and as soon as a sufficient number have collected a seine is drawn downstream at a rapid rate. Although salmon always swim against the current, when frightened they turn and go rapidly downstream, and as a consequence they are brought to a halt high and dry upon the lower end of the trap. They are then quickly assorted and placed in pens near the traps, the males and females being put in separate compartments. Most of the fishing during the season is done at night, the best hauls being usually made about an hour after dark.

Spawning operations commence in the morning and continue until all ripe fish have been stripped. The female is first taken from the pen by the spawn-taker, and if found to be ripe she is killed by striking her upon the back of the head with a club. She is then placed in the spawning-box, which is raised to a vertical position so that the eggs may be stripped into a pan held by an assistant. As soon as the milt is added to the eggs the contents are gently stirred until every egg has come in contact with it. A little water is then added and the pan placed aside for  $1\frac{1}{2}$  minutes, when it is handed to a third person, who washes the milt and dirt from the eggs by immersing the pan in water. The eggs are then carried in buckets to the hatchery, measured, and placed in baskets. The buckets hold about 15,000 eggs each, and are carried in pairs by means of yokes, one man carrying two buckets. The baskets to which they are transferred on arriving at the hatchery hold from 25,000 to 40,000 each, depending on the size

of the troughs used. After being placed in the troughs they are covered to exclude the light. On the first, second, and third days the dead eggs are picked off, after which they are not uncovered for at least 30 days, provided the water is clear. At the expiration of this period they are placed in water-buckets and a strong current of water turned on, which causes all of the unimpregnated eggs to turn white, while it does not injure the good ones. After the dead eggs have been removed the remainder are returned to the baskets.

The first eggs were secured September 11 and the last on October 10. During this period 10,385,000 were collected from 2,148 females, making an average of 4,835 per fish; 1,042,125 were lost in incubation; 250,000 were shipped to New Zealand, and 2,436,000 transferred to Clackamas. The eggs retained at the station hatched in November and the fry were liberated in December and January, as soon as the sac was absorbed, in the Little White Salmon, Dog Creek, and the Columbia River, the total loss being only 30,820 during the fry stage. In all 6,626,947 were planted in the streams referred to.

Several experimental forms of hatching and rearing apparatus were tried during the season, but proved unsatisfactory. It is believed, however, that the present forms can be materially improved upon.

Eggs of the blueback salmon were impregnated with milt of the quinnat and, contrary to theory, hatched nicely, the fry resulting being strong and healthy. Eggs of the humpback salmon were also fertilized with milt of the quinnat, giving as good results.

As the result of a number of experiments the conclusion was reached that an average of 825 eggs remain in a salmon after it has been stripped by the usual operation, and of these 48 per cent might be impregnated, or 400 eggs per fish; and, consequently, had all the eggs been removed through an incision made in the abdomen 859,000 more fry could have been hatched. The experiments seemed to demonstrate that where the eggs are removed through an incision and fertilized immediately before the blood is removed the loss would be about 3 per cent, whereas if the blood is quickly rinsed off before the milt is applied the loss is very heavy, sometimes averaging 99 per cent. Of the eggs remaining after the fish has been stripped by the usual method, only 48 per cent could be fertilized when they were removed through an incision.

On one salmon weighing about 40 pounds a lump as large as a man's head was observed immediately under the dorsal fin. The lump was found to consist partly of a gristly growth resembling a tumor and partly of a gelatinous substance, the former being of a light color and the latter of about the same shade as the fish. The eggs from this fish were good, and the lump had apparently not interfered at all with its locomotion. A male was also observed with all the characteristics of a female. Another fish with jaws crossed in such a way as to resemble a pair of shears was noted. The bones seemed not to have been broken.



During the early part of December the force at the station was occupied in building a boom around the premises, cutting down trees near the buildings and flume, and preparing for high water during the following summer. The boom as completed protects all the shore lines from drift. It was made from sticks of timber 40 to 60 feet in length and 12 to 20 inches in diameter. The amount of drift and lumber that settled on the station grounds the previous winter caused very serious inconvenience and necessitated an immense amount of work before the station could be opened.

During the fall the superintendent visited all the streams on both sides of the Columbia River, between Viento and Celilo Falls, Oregon, with the view to establishing auxiliary stations for taking and eying eggs. The only places that offer any possibilities are the falls at Celilo, where by running a fish-wheel during the closed season some ripe fish might be captured. On the Big White Salmon the prospects are better, except that logging operations would prevent the construction of a rack.

In December the station was closed and placed in charge of a watchman, and the superintendent was transferred east for duty in connection with the shad work.

BAKER LAKE STATION, WASHINGTON (H. H. BUCK, SUPERINTENDENT).

In July Mr. J. N. Wisner was instructed to proceed to Baker Lake and receive the station from the Washington Fish Commission, from whom it had been purchased, and turn it over to Mr. W. W. Thayer, who had been appointed superintendent. Mr. Thayer, after visiting the station, resigned and was succeeded by Mr. H. H. Buck, but in the interim Mr. Wisner employed a force of men and commenced clearing the seining-grounds and getting the equipment in readiness for the salmon work. By August 1 the permanent personnel, consisting of a superintendent, fish-culturist, and two laborers, had been appointed, and a good working force of temporary assistants taken on.

All supplies for the use of the station were packed in during August and September, as it is very difficult, if not dangerous, to bring in material late in the fall.

Early in September arrangements were completed for fishing for blueback or sockeye salmon, which seek the lake in large numbers to spawn in still water along its rocky shores. Gill nets 300 feet long and 20 feet deep were employed for the work here, as it was impossible to use seines, as the shores of the lake are covered with heavy timber which must have been killed by a rise of water from 50 to 100 years ago. The task of removing this material would be exceedingly expensive, and as it seems to afford shelter for the young fish and serves as a breeding-place for their food, it is questionable whether it would be advisable to do so. The nets are handled from boats, two



men in a boat, the plan being to attach one end to the shore and pay it out quietly in the arc of a circle around a spawning-bed. The inclosed salmon are then driven into the net by movements of the boat and splashing of the oars. The spawners are put into pens provided near the spawning-shed, which stands upon a large float in front of the hatchery, and the same process is repeated upon another part of the shore. As night approaches the nets may often be left set for two hours or more. On the same day or the one following the fish are handled in the usual manner by the spawn-takers.

The season practically closed October 28, though a few eggs were taken as late as November 10, and resulted in the collection of 11,613,000 eggs from 3,218 females. No record was kept of the number of males, but it is believed that at least 5,000 were used.

The hatchery, which is a wooden structure, is fitted with 74 troughs, each 16 feet long and containing 7 baskets. The number of eggs placed to a basket varied from 30,000 to 40,000, and each trough was given a maximum flow of 12 gallons of water per minute. The period of incubation for the first eggs collected was seventy-two days, at a mean temperature of 45° F., corresponding closely to the rule of fifty days at 50°, and five days more or less for each degree of lower or higher temperature, as established by Seth Green. The hatchery is supplied with water from the creek, which drains the hills on the south side of the lake, its normal volume being about 200 miner's inches of water, equal to about 2,000 gallons per minute. It is unfortunately subject to sudden rises, and at such times is muddy, which will necessitate the erection of a settling tank at some time in the future, in order to guard against losses of eggs.

Of the eggs collected, 92 per cent hatched, and 10,683,000 fry were liberated in the lake and in Skagit River. No attempt was made to ship eggs from the station on account of its isolated position. Hamilton, the nearest railroad station, is 36 miles away, and 18 miles of this distance is over a mountain trail. It is hoped that during the next year a trail will be opened up on the south side to Baker, where the railroad is now extending its tracks.

A few silver salmon appeared in the lake after the bluebacks, but as the hatchery was crowded, no attempt was made to handle them.

An effort was made to collect steelheads when the first fish appeared at the foot of the lake on March 9, but between that time and May 8 only 81 were captured in the gill nets. These were placed in the floating-pens to ripen, but most of them died, the 14 surviving females yielding 52,000 eggs, which hatched in about seventy-five days, in a mean temperature of 40½°. The losses aggregated 50 per cent, and occurred largely in the early stages of development. The mortality was supposed to have been due to the parent fish failing to properly mature their eggs on account of confinement in the pens.

*Details of distribution.*

| Species and disposition.                      | Eggs.     | Fry and fingerlings. | Adults and yearlings. |
|---|-----------|----------------------|-----------------------|
| <i>Shad:</i>                                  |           |                      |                       |
| State Fish Commission Ponds, Deep River, Conn |           | 4,080,000            |                       |
| Stratford, Conn                               |           | 2,040,000            |                       |
| Brandywine Creek, Wilmington, Del             |           | 5,175,000            |                       |
| Blackbird Creek, Middletown, Del              |           | 300,000              |                       |
| Smyrna Creek, Clayton, Del                    |           | 150,000              |                       |
| Leipsic Creek, Cheswold, Del                  |           | 150,000              |                       |
| St. Johns Creek, Dover, Del                   |           | 300,000              |                       |
| Lebanon, Del                                  |           | 450,000              |                       |
| Murderkill Creek, Felton, Del                 |           | 600,000              |                       |
| Frederica, Del                                |           | 450,000              |                       |
| Mispillion Creek, Milford, Del                |           | 600,000              |                       |
| Indian River, Millsboro, Del                  |           | 475,000              |                       |
| Anacostia River, Bennings Bridge, D. C        |           | 1,000,000            |                       |
| Twining City, D. C                            |           | 1,095,000            |                       |
| Potomac River, opposite fish lakes, D. C      |           |                      | 2,000,000             |
| St. Lucie River, Fort Pierce, Fla             |           | 160,000              |                       |
| New River, Fort Lauderdale, Fla               |           | 140,000              |                       |
| St. Marys River, Macclenny, Fla               |           | 200,000              |                       |
| Suwanee River, Ellaville, Fla                 |           | 340,000              |                       |
| Ocklocknee River, Ocklocknee, Fla             |           | 340,000              |                       |
| Aucilla River, Aucilla, Fla                   |           | 340,000              |                       |
| Chattahoochee River, Chattahoochee, Fla       |           | 376,000              |                       |
| Tomoka River, Ormond, Fla                     |           | 60,000               |                       |
| Spruce Creek, New Smyrna, Fla                 |           | 60,000               |                       |
| Savannah River, Augusta, Ga                   |           | 537,000              |                       |
| Flint River, Albany, Ga                       |           | 500,000              |                       |
| Ocmulgee River, Macon, Ga                     |           | 500,000              |                       |
| Ogeechee River, Millen, Ga                    |           | 500,000              |                       |
| Potomac River, off Bryan Point, Md            |           | 9,672,000            |                       |
| Piscataquis Creek, Md                         |           | 1,897,000            |                       |
| Accocek Creek, Md                             |           | 2,189,000            |                       |
| Pomonkey Creek, Md                            |           | 3,943,000            |                       |
| Bar Landing, Md                               |           | 1,670,000            |                       |
| Broad Creek, Md                               |           | 2,269,000            |                       |
| Swan Creek, Md                                |           | 1,237,000            |                       |
| Point of Rocks, Md                            |           | 750,000              |                       |
| Chesapeake Bay, Battery Haul, Md              |           | 4,758,000            |                       |
| Battery Flats, Md                             | 9,222,000 | 9,106,000            |                       |
| Eastern Flats, Md                             |           | 6,638,000            |                       |
| Battery Channel, Md                           | 2,071,000 | 10,598,000           |                       |
| Susquehanna Flats, Md                         |           | 2,267,000            |                       |
| Havre de Grace, Md                            |           | 621,000              |                       |
| Western Channel, Md                           |           | 10,823,000           |                       |
| Spesutia Narrows, Md                          |           | 2,157,000            |                       |
| Carpenter Point, Md                           |           | 650,000              |                       |
| Narrows, Md                                   |           | 455,000              |                       |
| Battery Shoals, Md                            | 6,418,000 |                      |                       |
| State Fish Commission, Baltimore, Md          | 4,000,000 |                      |                       |
| Susquehanna River, Port Deposit, Md           |           | 9,692,000            |                       |
| Garrett Island, Md                            |           | 1,000,000            |                       |
| Cooley Point, Md                              |           | 600,000              |                       |
| Gunpowder River, Gunpowder station, Md        |           | 455,000              |                       |
| Bush River, Bush River station, Md            |           | 1,460,000            |                       |
| Mill Creek, Mill Creek, Md                    |           | 1,500,000            |                       |
| Swan Creek, Swan Creek, Md                    |           | 2,400,000            |                       |
| Elk River, Elkton, Md                         |           | 450,000              |                       |
| Wicomico River, Salisbury, Md                 |           | 450,000              |                       |
| Tuckahoe Creek, Queen Anne, Md                |           | 450,000              |                       |
| Chester River, Chestertown, Md                |           | 450,000              |                       |
| Northeast River, Northeast, Md                |           | 483,000              |                       |
| Patuxent River, Laurel, Md                    |           | 687,000              |                       |
| Patapsco River, Relay station, Md             |           | 750,000              |                       |
| Wankinco River, Wareham, Mass                 |           | 300,000              |                       |
| Furnace Pond, Hanover, Mass                   |           | 200,000              |                       |
| Delaware River, off Gloucester, N. J          | 895,000   |                      |                       |
| Howell Cove, N. J                             | 4,954,000 | 12,832,000           |                       |
| off Bennett's fishery, N. J                   | 2,483,000 | 4,093,000            |                       |
| Milford, N. J                                 |           | 8,220,000            |                       |
| Lambertville, N. J                            |           | 12,610,000           |                       |
| Salem Creek, Salem, N. J                      |           | 700,000              |                       |
| Hudson River, Catskill, N. Y                  |           | 4,100,000            |                       |
| Albany, N. Y                                  |           | 4,120,000            |                       |
| Glens Falls, N. Y                             |           | 2,060,000            |                       |
| Edenton Bay, Edenton, N. C                    |           | 990,000              |                       |
| Albemarle Sound, Edenton, N. C                |           | 4,142,000            |                       |
| Chowan River, Colerain, N. C                  |           | 967,000              |                       |
| Mouth of Chowan River, Avoca, N. C            |           | 200,000              |                       |
| Roanoke River, Plymouth, N. C                 |           | 146,000              |                       |
| Susquehanna River, Peach Bottom, Pa           |           | 525,000              |                       |
| Fites Eddy, Pa                                |           | 1,050,000            |                       |
| Columbia, Pa                                  |           | 450,000              |                       |

*Details of distribution—Continued.*

| Species and disposition                            | Eggs.      | Fry and fingerlings. | Adults and yearlings. |
|--|------------|----------------------|-----------------------|
| <i>Shad—Continued.</i>                             |            |                      |                       |
| Delaware River, Lackawaxen, Pa                     |            | 450,000              |                       |
| Delaware Watergap, Pa                              |            | 450,000              |                       |
| State Fish Commission, Bristol, Pa                 | 6,006,000  |                      |                       |
| Palmer and Rulin River, Providence, R. I           |            | 500,000              |                       |
| Point Judith Pond, Wickford, R. I                  |            | 500,000              |                       |
| Pedee River, Pedee, S. C                           |            | 412,000              |                       |
| Santee River, St. Stephens, S. C                   |            | 400,000              |                       |
| Cooper River, Monks Corner, S. C                   |            | 400,000              |                       |
| Combahee River, Yemassee, S. C                     |            | 400,000              |                       |
| Edisto River, Ponpon, S. C                         |            | 400,000              |                       |
| Potomac River, off Craney Island Swash, Va         |            | 4,587,000            |                       |
| Occoquan Bay, Va                                   |            | 3,799,000            |                       |
| Mount Vernon, Va                                   |            | 2,199,000            |                       |
| Dogue Creek, Va                                    |            | 5,485,000            |                       |
| Hunting Creek, Va                                  |            | 2,885,000            |                       |
| Pohick Creek, Va                                   |            | 7,805,000            |                       |
| Nansemond River, Suffolk, Va                       |            | 485,000              |                       |
| Moreton Frewen, Queenstown, Ireland                | 700,000    |                      |                       |
| Total  | 36,749,000 | 202,307,000          | 2,000,000             |
| <i>Quinnat salmon:</i>                             |            |                      |                       |
| State Fish Commission, Sisson, Cal                 | 1,905,000  |                      |                       |
| Eel River, Cal                                     | 1,000,000  |                      |                       |
| McCloud River, Baird, Cal                          |            | 3,533,950            |                       |
| Shoal Creek, Neosho, Mo                            |            |                      | 200                   |
| Gasconade River, Arlington, Mo                     |            |                      | 300                   |
| Meramec River, Cuba, Mo                            |            |                      | 300                   |
| Hickory Creek, McMahon Spring, Mo                  |            |                      | 350                   |
| W. H. Phelps, Carthage, Mo                         |            |                      | 200                   |
| Clackamas River, Clackamas, Oreg                   |            | 4,369,422            |                       |
| Rogue River, Trail, Oreg                           |            | 2,156,945            |                       |
| Little White Salmon River, Chenowith, Wash         |            | 4,791,323            |                       |
| Skamania County, Wash                              |            | 839,624              |                       |
| Dog Creek, Chenowith, Wash                         |            | 112,000              |                       |
| Columbia River, Skamania County, Wash              |            | 784,000              |                       |
| Hatchery Creek, Skamania County, Wash              |            | 100,000              |                       |
| Government of New Zealand, Wellington, New Zealand | 250,000    |                      |                       |
| J. Williamson, Paris, France                       | 20,000     |                      |                       |
| Total  | 3,175,000  | 16,687,264           | 1,350                 |
| <i>Atlantic salmon:</i>                            |            |                      |                       |
| Sebec River, Milo, Me                              |            |                      | 33,000                |
| Pleasant River, Brownville, Me                     |            |                      | 154,692               |
| East Branch Penobscot River, Grindstone, Me        |            | 320,000              | 197,614               |
| East Branch Mattawamkeag River, Oakfield, Me       |            | 330,000              | 90,286                |
| West Branch Mattawamkeag River, Island Falls, Me   |            |                      | 45,595                |
| Alamoosook Lake, Orland, Me                        |            |                      | 20,671                |
| Toddy Pond, East Orland, Me                        |            | 19,639               |                       |
| Orland and Surry, Me                               |            | 78,434               |                       |
| Penobscot River and tributaries, Brownville, Me    |            | 160,000              |                       |
| State Fish Commission, Laconia, N. H               | 200,000    |                      |                       |
| Adirondack League Club, Fulton Chain, N. Y         | 100,000    |                      |                       |
| State Fish Commission, Allentown, Pa               | 250,000    |                      |                       |
| Total  | 550,000    | 908,073              | 541,858               |
| <i>Landlocked salmon:</i>                          |            |                      |                       |
| Herbert W. Burdette, Creede, Colo                  | 5,000      |                      |                       |
| State Fish Commission, Windsor Locks, Conn         |            |                      | 3,000                 |
| Reservoir, Seymour, Conn                           |            |                      | 2,000                 |
| Zoological Park, D. C                              |            | 3,850                |                       |
| Embsden Lake, North Anson, Me                      |            |                      | 2,000                 |
| Newfound Meadow Brook, Oakland, Me                 |            |                      | 1,000                 |
| Canaan Lake, Camden, Me                            |            |                      | 3,000                 |
| Wilson Lake, Wilton, Me                            |            |                      | 3,000                 |
| Phillips Lake, Lakehouse, Me                       |            |                      | 3,000                 |
| St. George Lake, Thorndike, Me                     |            |                      | 2,500                 |
| Sysladobsis Lake, Grand Lake Stream, Me            |            |                      | 8,000                 |
| Grand Lake, Grand Lake Stream, Me                  |            |                      | 36,000                |
| Grand Lake Stream, Grand Lake Stream, Me           |            |                      | 67,787                |
| Weld Pond, Wilton, Me                              |            |                      | 2,000                 |
| City Water Company's reservoir, Belfast, Me        |            |                      | 2,000                 |
| Moosehead Lake, Greenville, Me                     |            |                      | 6,000                 |
| Morrison Ponds, Amherst, Me                        |            |                      | 2,000                 |
| Long Pond, Mount Desert, Me                        |            |                      | 2,000                 |
| Hayden Lake, Skowhegan, Me                         |            |                      | 2,000                 |
| Meddybemps Lake, Eastport Junction, Me             |            |                      | 3,000                 |
| Howard Lake, Calais, Me                            |            |                      | 3,000                 |
| Myrick Lake, Hancock, Me                           |            |                      | 2,000                 |
| Round Pond, Shirley, Me                            |            |                      | 3,000                 |
| Molasses Pond, Franklin, Me                        |            |                      | 2,000                 |

*Details of distribution—Continued.*

| Species and disposition.                         | Eggs.   | Fry and finger-lings. | Adults and yearlings. |
|--|---------|-----------------------|-----------------------|
| <i>Landlocked salmon—Continued.</i>              |         |                       |                       |
| Donnell Pond, Franklin, Me                       |         |                       | 2,000                 |
| Moulton Pond, Moulton Lake, Me                   |         |                       | 2,000                 |
| Woods Pond, Ellsworth, Me                        |         |                       | 2,000                 |
| Duck and Junior lakes, Duck Lake, Me             |         |                       | 3,000                 |
| Lake Maranocook, Augusta, Me                     |         |                       | 3,000                 |
| Lake Cobbosseecontee, Augusta, Me                |         |                       | 3,000                 |
| Spring Lake, Carrebassett, Me                    |         |                       | 2,000                 |
| Varnum Pond, Farmington, Me                      |         |                       | 4,000                 |
| Clearwater Pond, Farmington, Me                  |         |                       | 2,000                 |
| Webb Pond, Ellsworth Falls, Me                   |         |                       | 4,000                 |
| Lake Anasagunticook, Canton, Me                  |         |                       | 2,000                 |
| Green Lake, Otis, Me                             |         |                       | 152,774               |
| Dedham, Me                                       |         |                       | 3,000                 |
| Squaw Pond, Presque Isle, Me                     |         |                       | 3,000                 |
| Toddy Pond, Orland, Me                           |         |                       | 20,154                |
| Surry, Me  |         | 7,000                 | 32,025                |
| Branch Pond, Dedham, Me                          |         |                       | 25,000                |
| Patten Pond, Ellsworth, Me                       |         |                       | 12,500                |
| Orland, Me                                       |         |                       | 6,112                 |
| Blunt Pond, Ellsworth, Me                        |         |                       | 1,500                 |
| Silver Lake, Great Pond, Me                      |         |                       | 4,000                 |
| Crystal Lake, Waldoboro, Me                      |         |                       | 500                   |
| Lake Moosetocmaguntic, Bemis, Me                 |         |                       | 2,000                 |
| Lunksoo Pond, Grindstone, Me                     |         |                       | 1,200                 |
| Heart Pond, East Orland, Me                      |         | 1,000                 |                       |
| Craig Pond, East Orland, Me                      |         | 2,000                 |                       |
| State Fish Commission, Enfield, Me               | 30,000  |                       |                       |
| Chain Ponds, Farmington, Me                      |         |                       | 2,000                 |
| Seven Ponds, Whittins Station, Mass              |         |                       | 2,000                 |
| Lake Quinsigamond, Worcester, Mass               |         |                       | 2,000                 |
| North Watuppa Lake, Watuppa, Mass                |         |                       | 2,000                 |
| Long Pond and Lake, Falmouth, Mass               |         |                       | 2,000                 |
| Lake Pearl, Wrentham, Mass                       |         |                       | 1,000                 |
| State Fish Commission, Wilkinsonville, Mass      | 20,000  |                       |                       |
| William H. Drew, Plymouth, Mass                  | 5,000   |                       |                       |
| G. H. Richards, Wenaumet, Mass                   | 5,000   |                       |                       |
| State Fish Commission, Paris, Mich               | 5,000   |                       |                       |
| Crystal Lake, Enfield, N. H                      |         |                       | 200                   |
| Mascoma Lake, Enfield, N. H                      |         |                       | 2,000                 |
| Penacook Lake, Concord, N. H                     |         |                       | 4,000                 |
| Lake Massabesic, Manchester, N. H                |         |                       | 2,000                 |
| Dan Hole Pond, Center Ossipee, N. H              |         |                       | 1,900                 |
| Bradley Pond, Andover, N. H                      |         |                       | 2,000                 |
| Lake Winnepesaukee, Laconia, N. H                |         |                       | 2,000                 |
| Applicant at Drewsville, N. H                    |         |                       | 500                   |
| State Fish Commission, Colebrook, N. H           | 10,000  |                       |                       |
| Adirondack League Club, Fulton Chain, N. Y       | 10,000  |                       |                       |
| Tuxedo Club, Tuxedo Park, N. Y                   | 10,000  |                       |                       |
| Lake George, Caldwell, N. Y                      |         |                       | 5,000                 |
| Lake Champlain, Fort Henry, N. Y                 |         |                       | 5,000                 |
| Paradox Lake, Ticonderoga, N. Y                  |         |                       | 500                   |
| State Fish Commission, Carolina, R. I            | 10,000  |                       |                       |
| State Fish Commission, Murray, Utah              | 10,000  |                       |                       |
| Derby Pond, Newport, Vt                          |         |                       | 1,100                 |
| Lake St. Catharine, Poultney, Vt                 |         |                       | 1,000                 |
| Caspian Lake, Greensboro, Vt                     |         |                       | 3,698                 |
| Willoughby Lake, Westmore, Vt                    |         |                       | 5,995                 |
| Long Pond, Westmore, Vt                          |         |                       | 2,992                 |
| Little Averill Pond, Averill, Vt                 |         |                       | 2,990                 |
| Lake Dunmore, Salisbury, Vt                      |         |                       | 1,560                 |
| State Fish Commission, St. Johnsbury, Vt         | 20,000  |                       |                       |
| Total  | 140,000 | 13,850                | 508,487               |
| <i>Silver salmon:</i>                            |         |                       |                       |
| Clackamas River and Clear Creek, Clackamas, Oreg |         | 146,824               |                       |
| <i>Sockeye or blueback salmon:</i>               |         |                       |                       |
| Baker Lake and stream, Baker Lake, Washington    |         | 10,683,000            |                       |
| <i>Steelhead trout:</i>                          |         |                       |                       |
| Cobbosseecontee Lake, Winthrop, Me               |         | 2,800                 |                       |
| Billings Pond, Bluehill, Me                      |         | 3,000                 |                       |
| Canaan Lake, Rockland, Me                        |         | 2,500                 |                       |
| Rocky Pond, Otis, Me                             |         |                       | 3,653                 |
| Alamoosook Lake, Orland, Me                      |         |                       | 226                   |
| Washington Harbor, Washington Harbor, Mich       |         | 5,000                 |                       |
| Grace Harbor, Washington Harbor, Mich            |         | 10,000                |                       |
| Baldwin Creek, Baldwin, Mich                     |         |                       | 4,335                 |
| Pickwick Lake, Pickwick, Minn                    |         | 13,500                |                       |
| French River, Duluth, Minn                       |         | 15,000                |                       |
| Sucker River, Two Harbors, Minn                  |         | 5,000                 |                       |
| Baptism River, Beaver Bay, Minn                  |         | 20,000                |                       |

*Details of distribution—Continued.*

| Species and disposition.                                | Eggs.   | Fry and finger-lings. | Adults and yearlings. |
|---|---------|-----------------------|-----------------------|
| <i>Steelhead trout—Continued.</i>                       |         |                       |                       |
| Poplar River, Lutsen, Minn .....                        | .....   | 20,000                | .....                 |
| Eagle Lake, St. Louis County, Minn .....                | .....   | 5,000                 | .....                 |
| Sucker River, Duluth, Minn .....                        | .....   | 15,000                | .....                 |
| Lester River, Duluth, Minn .....                        | .....   | 5,000                 | .....                 |
| State Fish Commission, St. Paul, Minn .....             | .....   | 20,000                | .....                 |
| Clear Creek and Clackamas River, Clackamas, Oreg .....  | .....   | 99,000                | .....                 |
| State Fish Commission, Murray, Utah .....               | 10,000  | .....                 | .....                 |
| Willoughby Lake, Westmore, Vt .....                     | .....   | 19,650                | 2,200                 |
| Baker Lake, Baker Lake, Wash .....                      | .....   | 26,000                | .....                 |
| A. J. McNab, Lake Nebagmain, Wis .....                  | 50,000  | .....                 | .....                 |
| Trout Brook Company, Hudson, Wis .....                  | 25,000  | .....                 | .....                 |
| Brule River, Winneboujou, Wis .....                     | .....   | 15,000                | .....                 |
| State Fish Commission, Laramie, Wyo .....               | 25,000  | .....                 | .....                 |
| Bear Tooth Lake, Bighorn County, Wyo .....              | .....   | .....                 | 5,000                 |
| Brooks and lakes, Bighorn County, Wyo .....             | .....   | .....                 | 5,000                 |
| Total .....   | 110,000 | 301,450               | 20,414                |
| <i>Loch Leven trout:</i>                                |         |                       |                       |
| Hartman Pond, South Bend, Ind .....                     | .....   | 5,000                 | .....                 |
| Maquoketa River, Forestville, Iowa .....                | .....   | .....                 | 1,700                 |
| Applicant at Plymouth, Mich .....                       | .....   | 3,000                 | .....                 |
| State Fish Commission, Laconia, N. H .....              | 20,000  | .....                 | .....                 |
| Total .....   | 20,000  | 8,000                 | 1,700                 |
| <i>Rainbow trout:</i>                                   |         |                       |                       |
| Spring Lake, Seale, Ala .....                           | .....   | .....                 | 500                   |
| Spring Lake, Springville, Ala .....                     | .....   | .....                 | 200                   |
| Applicants in Alabama .....                             | .....   | .....                 | 500                   |
| Liveoak Creek, Flagstaff, Ariz .....                    | .....   | .....                 | 2,400                 |
| Spring Creek, Denievville, Ark .....                    | .....   | .....                 | 3,800                 |
| Custer Creek, Batesville, Ark .....                     | .....   | .....                 | 1,900                 |
| Illinois River, Siloam Springs, Ark .....               | .....   | .....                 | 1,300                 |
| Buffalo Creek, Cove, Ark .....                          | .....   | .....                 | 1,100                 |
| Spring River, Mammoth Springs, Ark .....                | .....   | .....                 | 1,250                 |
| Applicants in Arkansas .....                            | .....   | .....                 | 1,000                 |
| Tumbling Rock Creek, Woodland Park, Colo .....          | .....   | .....                 | 500                   |
| Rox Park Lake, Leadville, Colo .....                    | .....   | .....                 | 500                   |
| North Fork South Platte River, South Platte, Colo ..... | .....   | .....                 | 500                   |
| Columbine Lake, Rockwood, Colo .....                    | .....   | .....                 | 650                   |
| St. Vrain River, Lyons, Colo .....                      | .....   | .....                 | 500                   |
| Dick Lake, Telluride, Colo .....                        | .....   | .....                 | 250                   |
| Frees Lake, Cimarron, Colo .....                        | .....   | .....                 | 200                   |
| Trout Creek, Como, Colo .....                           | .....   | .....                 | 500                   |
| Lake Lenore, Ouray, Colo .....                          | .....   | .....                 | 600                   |
| Dallas River, Ridgway, Colo .....                       | .....   | .....                 | 300                   |
| Frying Pan River, Thomasville, Colo .....               | .....   | .....                 | 500                   |
| Ruedi, Colo .....                                       | .....   | .....                 | 1,000                 |
| Norrie, Colo .....                                      | .....   | .....                 | 500                   |
| Eagle Lake, Thomasville, Colo .....                     | .....   | .....                 | 300                   |
| Lake No. 3, Cimarron, Colo .....                        | .....   | .....                 | 300                   |
| Lake Alicia, Thomasville, Colo .....                    | .....   | .....                 | 300                   |
| Fairview Lake, Thomasville, Colo .....                  | .....   | .....                 | 300                   |
| Spring Creek, Thomasville, Colo .....                   | .....   | .....                 | 300                   |
| Keno Lake, Aspen, Colo .....                            | .....   | .....                 | 400                   |
| Applicants in Colorado .....                            | .....   | .....                 | 100                   |
| State Fish Commission, Hartford, Conn .....             | 30,000  | .....                 | .....                 |
| State Fish Commission, Wilmington, Del .....            | .....   | .....                 | 1,000                 |
| Zoological Park, D. C .....                             | .....   | .....                 | 330                   |
| Chattahoochee River, Clarksville, Ga .....              | .....   | .....                 | 800                   |
| Ward and Norton creeks, Jasper, Ga .....                | .....   | .....                 | 500                   |
| Applicants in Georgia .....                             | .....   | .....                 | 1,999                 |
| Spirit Lake, Rathdrum, Idaho .....                      | .....   | .....                 | 3,000                 |
| Applicants in Idaho .....                               | .....   | .....                 | 3,000                 |
| Thomas Turton, Kilgore, Idaho .....                     | 10,000  | .....                 | .....                 |
| Black River, Sallisaw, Ind. T .....                     | .....   | .....                 | 1,300                 |
| Mill Creek, Bellevue, Iowa .....                        | .....   | .....                 | 500                   |
| Bear Creek, Edgewood, Iowa .....                        | .....   | .....                 | 400                   |
| Spring Branch, Manchester, Iowa .....                   | .....   | .....                 | 900                   |
| Applicants in Kansas .....                              | .....   | .....                 | 500                   |
| Onawa Lake, Greenville, Me .....                        | .....   | 1,000                 | .....                 |
| Canaan Lake, Rockland, Me .....                         | .....   | 800                   | .....                 |
| Long Pond, Somesville, Me .....                         | .....   | 1,000                 | .....                 |
| Alamoosook Lake, Orland, Me .....                       | .....   | .....                 | 9                     |
| Black Run, Deer Park, Md .....                          | .....   | .....                 | 500                   |
| Mountain Stream, Swanton, Md .....                      | .....   | .....                 | 550                   |
| Spring Branch, Texas, Md .....                          | .....   | .....                 | 268                   |
| Lake and stream, Glyndon, Md .....                      | .....   | .....                 | 200                   |
| Applicants in Maryland .....                            | .....   | .....                 | 919                   |
| State Fish Commission, Worcester, Mass .....            | 15,000  | .....                 | .....                 |
| Stony Creek, Shelby, Mich .....                         | .....   | .....                 | 191                   |
| Turk Lake, Greenville, Mich .....                       | .....   | .....                 | 193                   |

*Details of distribution—Continued.*

| Species and disposition.                     | Eggs.  | Fry and fingerlings. | Adults and yearlings. |
|--|--------|----------------------|-----------------------|
| <i>Rainbow trout—Continued.</i>              |        |                      |                       |
| Pine River, West Harrisonville, Mich         |        | 1,000                |                       |
| Paint Creek, Ypsilanti, Mich                 |        | 1,000                |                       |
| Spring Brook trout hatchery, Kalamazoo, Mich | 25,000 |                      |                       |
| Cowskin River, Lanagan, Mo                   |        |                      | 1,300                 |
| Railroad Pond, Cedargap, Mo                  |        |                      | 1,250                 |
| Railroad Pond, Mountain Grove, Mo            |        |                      | 1,250                 |
| Piney Creek, Cabool, Mo                      |        |                      | 1,250                 |
| Bennett Mill Spring, Lebanon, Mo             |        |                      | 1,700                 |
| Baker Lake, Franks, Mo                       |        |                      | 1,100                 |
| Gasconade River, Arlington, Mo               |        |                      | 2,300                 |
| Meramec River, Cuba, Mo                      |        |                      | 600                   |
| McMahon Spring, Neosho, Mo                   |        |                      | 500                   |
| Hickory Creek, Neosho, Mo                    |        |                      | 139                   |
| Applicants in Missouri                       |        |                      | 3,200                 |
| Elk Springs, Monida, Mont                    |        |                      | 5,000                 |
| Applicant at Red Rock, Mont                  |        |                      | 2,000                 |
| J. F. Comee, Missoula, Mont                  | 10,000 |                      |                       |
| State Fish Commission, South Bend, Nebr      |        |                      | 8,800                 |
| State Fish Commission, Laconia, N. H         | 20,000 |                      |                       |
| Applicant at Drewsville, N. H                |        |                      | 1,550                 |
| Musconetcong River, Junction, N. J           |        |                      | 1,000                 |
| Reeves Pond, Glassboro, N. J                 |        |                      | 1,000                 |
| Randall Pond, Glassboro, N. J                |        |                      | 1,000                 |
| Pequest Creek, Belvidere, N. J               |        |                      | 1,000                 |
| Cooper Creek, Haddonfield, N. J              |        |                      | 1,000                 |
| Applicants in New Jersey                     |        |                      | 800                   |
| Vermejo Creek, Catskill, N. Mex              |        |                      | 350                   |
| Vermejo Creek, Maxwell City, N. Mex          |        |                      | 350                   |
| Bayado Creek, Springer, N. Mex               |        |                      | 350                   |
| Trout Springs, Las Vegas, N. Mex             |        |                      | 350                   |
| Rio Bonito Creek, Peters, N. Mex             |        |                      | 500                   |
| Chicrica Creek, Raton, N. Mex                |        |                      | 350                   |
| Reservoir, Raton, N. Mex                     |        |                      | 350                   |
| Penasco Creek, Toboggan, N. Mex              |        |                      | 300                   |
| Fresnal Creek, Fresno, N. Mex                |        |                      | 200                   |
| Mal Pais Spring, Three Rivers, N. Mex        |        |                      | 700                   |
| Mescalero Creek, Tularosa, N. Mex            |        |                      | 300                   |
| Eagle Creek, Gilmore, N. Mex                 |        |                      | 500                   |
| Ruidosa Creek, Ruidosa, N. Mex               |        |                      | 500                   |
| Spring Lake, Herkimer, N. Y                  |        |                      | 400                   |
| Gip Creek, Andrews, N. C                     |        |                      | 1,000                 |
| Green River, Hendersonville, N. C            |        |                      | 1,000                 |
| Yadkin River, Lenore, N. C                   |        |                      | 1,000                 |
| South Fork New River, Lenore, N. C           |        |                      | 500                   |
| Grassy Creek, Marion, N. C                   |        |                      | 500                   |
| Mountain stream, Marion, N. C                |        |                      | 1,000                 |
| Sam Creek, Marion, N. C                      |        |                      | 500                   |
| Crabtree Creek, Marion, N. C                 |        |                      | 500                   |
| Buck Creek, Marion, N. C                     |        |                      | 500                   |
| Clear Creek, Marion, N. C                    |        |                      | 500                   |
| Beaver Creek, Marion, N. C                   |        |                      | 1,000                 |
| Toe Creek, Marion, N. C                      |        |                      | 1,000                 |
| Pine Branch, Marion, N. C                    |        |                      | 500                   |
| Canoe Branch, Marion, N. C                   |        |                      | 500                   |
| Little Bear Creek, Marion, N. C              |        |                      | 500                   |
| Rose Creek, Marion, N. C                     |        |                      | 500                   |
| Gorge Creek, Marion, N. C                    |        |                      | 500                   |
| North Fork Creek, Marion, N. C               |        |                      | 1,000                 |
| Elk River, Elk Park, N. C                    |        |                      | 1,000                 |
| Baker Creek, Fayetteville, N. C              |        |                      | 500                   |
| French Broad River, Biltmore, N. C           |        |                      | 500                   |
| Blevin Creek, Cranberry, N. C                |        |                      | 1,000                 |
| C. A. Schenck, Biltmore, N. C                | 10,000 |                      |                       |
| Applicants in North Carolina                 |        |                      | 2,250                 |
| Applicant at Oxford, Ohio                    |        | 1,000                |                       |
| Spring Creek, Bridgeport, Okla               |        |                      | 1,000                 |
| Rock Creek, Shattuc, Okla                    |        |                      | 350                   |
| Silver Lake, Morvin, Okla                    |        |                      | 500                   |
| Applicants in Oklahoma                       |        |                      | 600                   |
| McKay and Pearson Creek, Pendleton, Oreg     |        | 22,303               |                       |
| Stream and pond, Wilkesbarre, Pa             |        |                      | 200                   |
| Rogue Harbor Creek, Westover, Pa             |        |                      | 450                   |
| Buckmountain Dam, Ashland, Pa                |        |                      | 300                   |
| West Fall Creek, Ashland, Pa                 |        |                      | 300                   |
| Bentley Creek Pond, Tioga, Pa                |        |                      | 600                   |
| Mill Creek, Tioga, Pa                        |        |                      | 300                   |
| Laurel Creek, Redding, Pa                    |        |                      | 300                   |
| Blair River, Altoona, Pa                     |        |                      | 300                   |
| Three-Spring Run, Altoona, Pa                |        |                      | 300                   |
| Piney Creek, Altoona, Pa                     |        |                      | 300                   |
| Clover Creek, Altoona, Pa                    |        |                      | 800                   |
| Spruce Creek, Altoona, Pa                    |        |                      | 300                   |
| Bell Run, Altoona, Pa                        |        |                      | 300                   |



*Details of distribution—Continued.*

| Species and disposition.                    | Eggs. | Fry and fingerlings. | Adults and yearlings. |
|---|-------|----------------------|-----------------------|
| <i>Rainbow trout—Continued.</i>             |       |                      |                       |
| Genesee Fork of Pine Creek, Ulysses, Pa.    |       |                      | 1,000                 |
| Dyberry Creek, Honesdale, Pa.               |       |                      | 600                   |
| Butternut Creek, Honesdale, Pa.             |       |                      | 600                   |
| Boyd Brook, Honesdale, Pa.                  |       |                      | 300                   |
| Lackawaxen River, Honesdale, Pa.            |       |                      | 300                   |
| East Branch, Honesdale, Pa.                 |       |                      | 300                   |
| Barney Creek, Smethport, Pa.                |       |                      | 200                   |
| Robbins Brook, Smethport, Pa.               |       |                      | 200                   |
| Gallup Brook, Smethport, Pa.                |       |                      | 200                   |
| Daly Brook, Smethport, Pa.                  |       |                      | 200                   |
| Beaver Run, Smethport, Pa.                  |       |                      | 200                   |
| Blacksmith Brook, Smethport, Pa.            |       |                      | 200                   |
| Boyer Brook, Smethport, Pa.                 |       |                      | 200                   |
| Lock Run, Ralston, Pa.                      |       |                      | 200                   |
| Frozen Run, Ralston, Pa.                    |       |                      | 400                   |
| Lycoming Creek, Ralston, Pa.                |       |                      | 200                   |
| Mehoopany Creek, Mehoopany, Pa.             |       |                      | 300                   |
| West Branch Potato Creek, Colegrove, Pa.    |       |                      | 200                   |
| Black Lick Creek, Ebensburg, Pa.            |       |                      | 450                   |
| Zeller Run, Mifflinburg, Pa.                |       |                      | 450                   |
| Raritan Run, Mifflinburg, Pa.               |       |                      | 450                   |
| Spruce Run, Lewisburg, Pa.                  |       |                      | 600                   |
| Spruce Creek, Tyrone, Pa.                   |       |                      | 600                   |
| Big Fill Run, Tyrone, Pa.                   |       |                      | 300                   |
| McAteer Run, Tyrone, Pa.                    |       |                      | 300                   |
| Brandywine Creek, Avondale, Pa.             |       |                      | 600                   |
| Spring Brook, Moosic, Pa.                   |       |                      | 300                   |
| Trout and Monument creeks, Moosic, Pa.      |       |                      | 400                   |
| Lick Run, Roaring Branch, Pa.               |       |                      | 300                   |
| Roaring Branch, Roaring Branch, Pa.         |       |                      | 300                   |
| Salt Springs Run, Roaring Branch, Pa.       |       |                      | 200                   |
| Mill Creek, Roaring Branch, Pa.             |       |                      | 1,000                 |
| Sugarworks Run, Roaring Branch, Pa.         |       |                      | 200                   |
| Lycoming Creek, Roaring Branch, Pa.         |       |                      | 400                   |
| Falling Springs, Chambersburg, Pa.          |       |                      | 2,600                 |
| Park Creek, Penllyn, Pa.                    |       |                      | 200                   |
| Spring Creek, Penllyn, Pa.                  |       |                      | 200                   |
| Dodge Brook, Harrison Valley, Pa.           |       |                      | 400                   |
| Marsh Creek, Harrison Valley, Pa.           |       |                      | 200                   |
| Spring Run, Reynoldsville, Pa.              |       |                      | 200                   |
| Lamott Branch, New Freedom, Pa.             |       |                      | 600                   |
| Spring Lake, Frazer, Pa.                    |       |                      | 300                   |
| Sulphur Spring Run, Irvine, Pa.             |       |                      | 300                   |
| Quakaka Creek and Pond, Shenandoah, Pa.     |       |                      | 300                   |
| Mill Creek, Coudersport, Pa.                |       |                      | 400                   |
| Allegheny River, Coudersport, Pa.           |       |                      | 1,400                 |
| Gardiner Spring Brook, Coudersport, Pa.     |       |                      | 700                   |
| Mill Creek, Birdsboro, Pa.                  |       |                      | 900                   |
| Birdsboro Reservoir, Birdsboro, Pa.         |       |                      | 700                   |
| Sixpenny Creek, Birdsboro, Pa.              |       |                      | 600                   |
| Pine Creek, Birdsboro, Pa.                  |       |                      | 300                   |
| Hay Creek, Birdsboro, Pa.                   |       |                      | 300                   |
| French Creek, Birdsboro, Pa.                |       |                      | 300                   |
| Powdermill Creek, Birdsboro, Pa.            |       |                      | 500                   |
| Millbach Creek, Sheridan, Pa.               |       |                      | 300                   |
| Antietam Creek, Waynesboro, Pa.             |       |                      | 200                   |
| Stone Creek, Huntingdon, Pa.                |       |                      | 400                   |
| Detwiler Run, Huntingdon, Pa.               |       |                      | 200                   |
| Spruce Creek, Huntingdon, Pa.               |       |                      | 200                   |
| Lake of Herod's Queen, Huntingdon, Pa.      |       |                      | 200                   |
| Middle Fork of Bell Run, Potter County, Pa. |       |                      | 1,000                 |
| Cedar Run, Lockhaven, Pa.                   |       |                      | 600                   |
| McElhattan Run, Lockhaven, Pa.              |       |                      | 1,200                 |
| Fishing Creek, Lockhaven, Pa.               |       |                      | 400                   |
| Cherry Run, Lockhaven, Pa.                  |       |                      | 200                   |
| Rattlesnake Run, Lockhaven, Pa.             |       |                      | 200                   |
| Lick Run, Lockhaven, Pa.                    |       |                      | 200                   |
| Spring Run, Lockhaven, Pa.                  |       |                      | 400                   |
| Hyner Creek, Lockhaven, Pa.                 |       |                      | 200                   |
| Spring Meadow Brook, Bedford, Pa.           |       |                      | 300                   |
| Rock Run, Westover, Pa.                     |       |                      | 300                   |
| Tucquan Creek, Rawlinsville, Pa.            |       |                      | 300                   |
| Hoover Run, Cresson, Pa.                    |       |                      | 300                   |
| Wallace Run, Bellefonte, Pa.                |       |                      | 400                   |
| Spring Creek, Bellefonte, Pa.               |       |                      | 1,400                 |
| Buffalo Creek, Bellefonte, Pa.              |       |                      | 200                   |
| Logan Branch, Bellefonte, Pa.               |       |                      | 400                   |
| Rock Run, Bellefonte, Pa.                   |       |                      | 200                   |
| Bens Creek, Johnstown, Pa.                  |       |                      | 300                   |
| Mountain Stream, Johnstown, Pa.             |       |                      | 300                   |
| Solomon and Adams creeks, Johnstown, Pa.    |       |                      | 300                   |
| Mosquito Creek, Williamsport, Pa.           |       |                      | 600                   |
| Wolf Run, Williamsport, Pa.                 |       |                      | 200                   |

*Details of distribution—Continued.*

| Species and disposition.                         | Eggs. | Fry and fingerlings. | Adults and yearlings. |
|--|-------|----------------------|-----------------------|
| <i>Rainbow trout—Continued.</i>                  |       |                      |                       |
| Mill Creek, Scranton, Pa.                        |       |                      | 200                   |
| Pennypack Creek, Willowgrove, Pa.                |       |                      | 200                   |
| Spruce Creek, Pottsville, Pa.                    |       |                      | 300                   |
| Bear Run, Bear Run, Pa.                          |       |                      | 1,000                 |
| Swamp Run, Bear Run, Pa.                         |       |                      | 500                   |
| Silver Spring Run, Bear Run, Pa.                 |       |                      | 500                   |
| Beech Creek, Snowshoe, Pa.                       |       |                      | 300                   |
| Miller Creek, Hamburg, Pa.                       |       |                      | 300                   |
| Beaver Dam Run, Hooversville, Pa.                |       |                      | 300                   |
| Rattlesnake Run, Wetham, Pa.                     |       |                      | 300                   |
| Starancea Creek, Lanesboro, Pa.                  |       |                      | 200                   |
| Roaring Run, Wilkesbarre, Pa.                    |       |                      | 300                   |
| Black Creek, Tremont, Pa.                        |       |                      | 500                   |
| Trout Run, Morristown, Pa.                       |       |                      | 500                   |
| McGinnis Run, Ligonier, Pa.                      |       |                      | 300                   |
| North Branch Wopwallopen Creek, Wopwallopen, Pa. |       |                      | 200                   |
| Spring Brook, Potterbrook, Pa.                   |       |                      | 300                   |
| Applicant at Kasiessville, Pa.                   |       | 6,000                |                       |
| Applicants in Pennsylvania                       |       |                      | 3,000                 |
| Conneross Creek, Walhalla, S. C.                 |       |                      | 400                   |
| Drake Springs, Sioux Falls, S. Dak.              |       |                      | 1,000                 |
| Cedar Creek Pond, Morristown, Tenn.              |       |                      | 200                   |
| Stone River, Murfreesboro, Tenn.                 |       |                      | 300                   |
| Spring Lake, Murfreesboro, Tenn.                 |       |                      | 300                   |
| Collins Spring Branch, Belmont, Tenn.            |       |                      | 450                   |
| Camp Creek, Greenville, Tenn.                    |       |                      | 400                   |
| Richland Creek, Greenville, Tenn.                |       |                      | 400                   |
| Spring Lake, Corryton, Tenn.                     |       |                      | 500                   |
| Indian Creek, Agee, Tenn.                        |       |                      | 500                   |
| Caney Creek, Rogersville, Tenn.                  |       |                      | 500                   |
| Dry Creek, Garbers, Tenn.                        |       |                      | 500                   |
| Doe River, Hampton, Tenn.                        |       |                      | 500                   |
| Roan Mountain, Tenn.                             |       |                      | 500                   |
| Laurel Fork, Hampton, Tenn.                      |       |                      | 500                   |
| Elizabethton, Tenn.                              |       |                      | 1,000                 |
| Bee and Glade Creeks, Seals, Tenn.               |       |                      | 450                   |
| Nolachucky River, Chestoa, Tenn.                 |       |                      | 1,000                 |
| Little River, Maryville, Tenn.                   |       |                      | 450                   |
| South Indian Creek, Unicoi County, Tenn.         |       |                      | 2,000                 |
| Rock Creek, Unicoi County, Tenn.                 |       |                      | 1,000                 |
| Indian Creek, Unicoi County, Tenn.               |       |                      | 2,000                 |
| Granny Lewis Creek, Unicoi County, Tenn.         |       |                      | 400                   |
| Dick Creek, Unicoi County, Tenn.                 |       |                      | 1,000                 |
| Hollow Poplar Creek, Hollow Poplar, Tenn.        |       |                      | 600                   |
| Silver Lake, Johnson County, Tenn.               |       |                      | 500                   |
| Dry Creek, Drycreek, Tenn.                       |       |                      | 500                   |
| Big Creek, Jacksboro, Tenn.                      |       |                      | 580                   |
| Applicants in Tennessee                          |       |                      | 470                   |
| Colony Fork Lake, Ranger, Tex.                   |       |                      | 500                   |
| Beaver Pond, Proctor, Vt.                        |       |                      | 1,500                 |
| South Fork Appomattox River, Appomattox, Va.     |       |                      | 500                   |
| Tom Creek, Coeburn, Va.                          |       |                      | 500                   |
| Pond and creek, Tazewell, Va.                    |       |                      | 500                   |
| Millpond in Falling River, Brookneal, Va.        |       |                      | 500                   |
| Hale Spring and brook, Gate City, Va.            |       |                      | 500                   |
| Millpond, Occoonita, Va.                         |       |                      | 200                   |
| Little River, East Lexington, Va.                |       |                      | 500                   |
| Dry River, Harrisonburg, Va.                     |       |                      | 2,500                 |
| Dry Run, Wytheville, Va.                         |       |                      | 50                    |
| Tate Run, Wytheville, Va.                        |       |                      | 1,044                 |
| Dan River, Stuart, Va.                           |       |                      | 910                   |
| Millpond, Glade Spring, Va.                      |       |                      | 300                   |
| Big Stoney Creek, Pearisburg, Va.                |       |                      | 500                   |
| Abraham Creek, Winchester, Va.                   |       |                      | 500                   |
| Reservoir, Crozet, Va.                           |       |                      | 200                   |
| Water Company's reservoir, Roanoke, Va.          |       |                      | 500                   |
| Cowardin Run, Hot Springs, Va.                   |       |                      | 500                   |
| Healing Springs Creek, Hot Springs, Va.          |       |                      | 1,000                 |
| Reservoir, Lynchburg, Va.                        |       |                      | 500                   |
| Spring Brook, Winchester, Va.                    |       |                      | 500                   |
| Van Clure Spring, Winchester, Va.                |       |                      | 20                    |
| Mountain Lake, Mountain Lake, Va.                |       |                      | 1,000                 |
| Walker Little Creek, Pulaski City, Va.           |       |                      | 1,500                 |
| Big Stoney Creek, Pembroke, Va.                  |       |                      | 1,000                 |
| Tye River, Vesuvius, Va.                         |       |                      | 500                   |
| Mill Creek, Millboro, Va.                        |       |                      | 1,500                 |
| Applicant at Round Hill, Va.                     |       |                      | 22                    |
| Applicants in Virginia                           |       |                      | 3,500                 |
| Snowy Creek, Terra Alta, W. Va.                  |       |                      | 300                   |
| Indian Run, Berkeley Springs, W. Va.             |       |                      | 500                   |
| Meadow Brook, Berkeley Springs, W. Va.           |       |                      | 500                   |
| White Oak Spring Run, Terra Alta, W. Va.         |       |                      | 500                   |
| Ice Pond, Bens Run, W. Va.                       |       |                      | 250                   |

*Details of distribution—Continued.*

| Species and disposition.  | Eggs.          | Fry and fingerlings. | Adults and yearlings. |
|---|----------------|----------------------|-----------------------|
| <i>Rainbow trout—Continued.</i>   |                |                      |                       |
| Tug River, Naugatuck, W. Va   |                |                      | 998                   |
| Tuscarora Creek, Martinsburg, W. Va   |                |                      | 500                   |
| Spring Lake, Martinsburg, W. Va   |                |                      | 1,000                 |
| Southwood Spring, Martinsburg, W. Va  |                |                      | 500                   |
| Glade Creek, Glade, W. Va   |                |                      | 475                   |
| Laurel Creek, Alderson, W. Va   |                |                      | 325                   |
| Tygart Valley River, Elkins, W. Va  |                |                      | 500                   |
| Blackwater River, Davis, W. Va  |                |                      | 1,000                 |
| Rocky Marsh Run, Shepherdstown, W. Va   |                |                      | 500                   |
| Black Run, Huttonsville, W. Va  |                |                      | 1,000                 |
| Cheat Mountain hatchery ponds, Huttonsville, W. Va                                      |                |                      | 500                   |
| Browning Dam, Preston County, W. Va   |                |                      | 1,000                 |
| Indian Creek, Fort Spring, W. Va  |                |                      | 800                   |
| Trout Run, Romney, W. Va  |                |                      | 500                   |
| Little Kanawha River, Burnsville, W. Va   |                |                      | 500                   |
| Elk River, Sutton, W. Va  |                |                      | 500                   |
| Tributaries of Spruce Run, Harman, W. Va  |                |                      | 500                   |
| Applicants in West Virginia   |                |                      | 1,300                 |
| F. A. Degler, Cheat Bridge, W. Va   | 25,000         |                      |                       |
| State Fish Commission, Sheridan, Wyo.   | 20,000         |                      |                       |
| Laramie, Wyo.   | 25,000         |                      |                       |
| H. M. Phipps, Inverness, Scotland   | 10,000         |                      |                       |
| Walter Bailey, Malvern Wells, England   | 20,000         |                      |                       |
| John Dinsmore, Ballymena, Ireland   | 20,000         |                      |                       |
| Moreton Frewen, Innishannon, Ireland  | 15,000         |                      |                       |
| <b>Total</b>  | <b>255,000</b> | <b>34,166</b>        | <b>209,572</b>        |
| <i>Black-spotted trout:</i>   |                |                      |                       |
| Ross Pond, Granite, Colo  |                |                      | 10,000                |
| Castlewood Lake, Castlerock, Colo   |                |                      | 20,000                |
| Brush Creek, Eagle, Colo  |                |                      | 20,000                |
| Spring Lake, Twinlakes, Colo  |                |                      | 10,000                |
| South Platte River, Alma, Colo  |                |                      | 20,000                |
| South Platte River and tributaries between Grant and Buffalo, Colo.                     |                |                      | 40,000                |
| Grand Lake, Grandlake, Colo   |                |                      | 20,000                |
| State Fish Commission, Denver, Colo   |                |                      | 75,000                |
| Prospect Lake, Telluride, Colo  |                |                      | 20,000                |
| Mammoth Creek, Mammoth Lake, South Boulder Creek, Jenny Lind Creek, Central City, Colo. |                |                      | 20,000                |
| North and south branches of St. Vrain River, Lyons, Colo                                |                |                      | 20,000                |
| Los Pinos River, Cumbres, Colo  |                |                      | 25,000                |
| South Bear and Marshall creeks, Iola, Colo  |                |                      | 25,000                |
| Gypsum Creek, Gypsum, Colo  |                |                      | 15,000                |
| Texas Creek, Cotopaxi, Colo   |                |                      | 15,000                |
| Frying Pan River, Thomasville, Colo   |                |                      | 50,000                |
| Surface Creek, Delta, Colo  |                |                      | 20,000                |
| Eagle River, Wolcott, Colo  |                |                      | 20,000                |
| R. A. Osborn, Rea, Idaho  | 10,000         |                      |                       |
| Twin Lakes, Rathdrum, Idaho   |                |                      | 5,000                 |
| Spirit Lake, Rathdrum, Idaho  |                |                      | 5,000                 |
| Anderson millpond, Vollmer, Idaho   |                |                      | 5,000                 |
| Henry Lake, Fremont County, Idaho   |                | 100,000              |                       |
| Lake Palmer, near Butte, Mont   |                |                      | 5,000                 |
| Little Blacktail Lake, near Butte, Mont   |                |                      | 5,000                 |
| Spring Brook, Redrock, Mont   |                |                      | 5,000                 |
| Bozeman Fork Creek, Leadboro, Mont  |                |                      | 10,000                |
| Spring Creek millpond, Lewis, Mont  |                |                      | 10,000                |
| Sixteen-mile Creek, between Lombard and Dorsey, Mont                                    |                |                      | 10,000                |
| Little Boulder Creek, Boulder, Mont   |                |                      | 10,000                |
| Cottonwood Creek, Bozeman, Mont   |                |                      | 10,000                |
| Tributaries of Big Hole River, Browns Station, Mont                                     |                |                      | 10,000                |
| Wisconsin Lake, Twin Bridges, Mont  |                |                      | 10,000                |
| Vincent Lake, Anaconda, Mont  |                |                      | 10,000                |
| Rock Creek, Browns Station, Mont  |                |                      | 10,000                |
| Reservoir, Lewiston, Mont   |                |                      | 10,000                |
| Basin Lake Reservoir, Portage, Mont   |                |                      | 5,000                 |
| Gold Creek, Pioneer, Mont   |                |                      | 5,000                 |
| Marias Run, Shelby, Mont  |                |                      | 20,000                |
| Spring Creek, Salesville, Mont  |                |                      | 10,000                |
| Cliff Lake, Monida, Mont  |                | 20,000               |                       |
| Waterdog Lake, Sweetgrass, Mont   |                |                      | 10,000                |
| Mill Creek, Salem, Oreg   |                |                      | 10,000                |
| South Fork Spearfish Creek, Elmore, S. Dak  |                |                      | 2,000                 |
| Beaver Creek, Buffalo Gap, S. Dak   |                |                      | 2,000                 |
| Silver Creek, Sturgis, S. Dak   |                |                      | 4,000                 |
| Rosebud and Rock creeks, Rosebud Agency, S. Dak   |                |                      | 2,000                 |
| Applicants in South Dakota  |                |                      | 5,000                 |
| Camil Lake, Blossburg, Wash   |                |                      | 3,000                 |
| Lake Creek, Harrington, Wash  |                |                      | 4,000                 |

*Details of distribution—Continued.*

| Species and disposition.                      | Eggs.  | Fry and fingerlings. | Adults and yearlings. |
|---|--------|----------------------|-----------------------|
| <i>Black-spotted trout—Continued.</i>         |        |                      |                       |
| Little Spokane River, Spokane, Wash           |        |                      | 10,000                |
| Plugh Creek, Spokane, Wash                    |        |                      | 5,000                 |
| Natches River, North Yakima, Wash             |        |                      | 5,000                 |
| Yakima River, Cle Elum, Wash                  |        |                      | 5,000                 |
| Touchet River, Dayton, Wash                   |        |                      | 5,000                 |
| Sequillitchew, Tacoma, Wash                   |        |                      | 10,000                |
| American Lake, Tacoma, Wash                   |        |                      | 10,000                |
| Gravelly Lake, Tacoma, Wash                   |        |                      | 10,000                |
| State Fish Commission, Laramie, Wyo           | 75,000 |                      |                       |
| Bear Tooth Lake, Bighorn County, Wyo          |        |                      | 10,000                |
| Sunlight Creek, Bighorn County, Wyo           |        |                      | 10,000                |
| Total   | 85,000 | 120,000              | 737,000               |
| <i>Brook trout:</i>                           |        |                      |                       |
| Robert Mathis, Cajon, Cal                     | 10,000 |                      |                       |
| South Platte River, Florissant, Colo          |        | 3,000                | 10,000                |
| Hartsell, Colo                                |        | 10,000               |                       |
| Lake Lenore, Ouray, Colo                      |        | 5,000                |                       |
| Mahon Brook, Buenavista, Colo                 |        | 5,000                |                       |
| Frying Pan River, Basalt, Colo                |        | 10,000               |                       |
| Norrie, Colo                                  |        | 5,000                |                       |
| Thomasville, Colo                             |        | 5,000                |                       |
| Ruedi, Colo                                   |        | 10,000               |                       |
| Spring Creek, Montrose, Colo                  |        | 13,000               |                       |
| Reservoir, Eastonville, Colo                  |        | 3,000                |                       |
| Lake Alicia, Thomasville, Colo                |        | 3,000                |                       |
| Dallas River, Ridgway, Colo                   |        | 5,000                |                       |
| Lake Isherwood, Salida, Colo                  |        | 1,000                |                       |
| South Arkansas River, Salida, Colo            |        | 11,000               |                       |
| Lake No. 3, Cimarron, Colo                    |        | 3,000                |                       |
| Big Cimarron River, Cimarron, Colo            |        | 5,000                |                       |
| Little Cimarron River, Cimarron, Colo         |        | 5,000                |                       |
| Spring Lake, Cimarron, Colo                   |        | 2,000                |                       |
| Eagle River, Berrys Station, Colo             |        | 10,000               |                       |
| Wolcott, Colo                                 |        | 15,000               | 20,000                |
| Chaquauqua Lake, Telluride, Colo              |        | 5,000                |                       |
| Lake San Cristobal, Lake City, Colo           |        | 10,000               |                       |
| Lake Fork Gunnison River, Lake City, Colo     |        | 10,000               |                       |
| Bear Creek, Morrison, Colo                    |        | 3,000                |                       |
| North Fork Big Thompson River, Loveland, Colo |        | 10,000               |                       |
| Summit Lake, Sawpit, Colo                     |        | 5,000                |                       |
| Tennessee Creek, Leadville, Colo              |        | 20,000               |                       |
| Goose Creek, Wagonwheel Gap, Colo             |        | 20,000               |                       |
| Mount Sopris Lake, Carbondale, Colo           |        | 10,000               |                       |
| Applicants in Colorado                        |        | 14,000               |                       |
| State Fish Commission, Hartford, Conn         | 20,000 |                      |                       |
| Kettle Brook, Hartford, Conn                  |        | 14,985               |                       |
| Norwalk River, South Wilton, Conn             |        | 10,000               |                       |
| Shotgun Creek, Spencer, Idaho                 |        |                      | 4,000                 |
| Blue Lake, Bluelake, Idaho                    |        |                      | 3,000                 |
| Fish Lake, Rathdrum, Idaho                    |        |                      | 4,000                 |
| Thorp Lake, Rathdrum, Idaho                   |        |                      | 2,000                 |
| Elk Creek, Kendrick, Idaho                    |        |                      | 3,000                 |
| R. A. Osborn, Rea, Idaho                      | 15,000 |                      |                       |
| Galeon River, Hatch Mills, Ind                |        | 10,000               |                       |
| St. Jo Pond and Creek, South Bend, Ind        |        | 10,000               |                       |
| Graveyard Run, Mongo, Ind                     |        | 5,000                |                       |
| Spring Lake, Niles, Ind                       |        | 1,000                |                       |
| Applicants in Indiana                         |        | 2,000                |                       |
| Canoe and Bear creeks, Decorah, Iowa          |        |                      | 2,000                 |
| Mill Creek, Bellevue, Iowa                    |        |                      | 2,000                 |
| Snymagill Creek, McGregor, Iowa               |        |                      | 2,000                 |
| Village Creek, Lansing, Iowa                  |        |                      | 5,000                 |
| Clear Creek, Lansing, Iowa                    |        |                      | 5,000                 |
| Bacon Creek, Lansing, Iowa                    |        |                      | 5,000                 |
| Bear Creek, Edgewood, Iowa                    |        |                      | 2,000                 |
| Maquoketa River, Forestville, Iowa            |        |                      | 5,250                 |
| Manchester, Iowa                              |        |                      | 5,000                 |
| Spring Branch, Manchester, Iowa               |        | 25,000               | 5,800                 |
| Applicants in Iowa                            |        |                      | 1,300                 |
| Lake Walking, Mildale, Ky                     |        |                      | 450                   |
| Lake Isham, View, Ky                          |        |                      | 450                   |
| Applicant at Nolin, Ky                        |        |                      | 180                   |
| Canaan Lake, Camden, Me                       |        | 10,000               |                       |
| Norton Lake, Camden, Me                       |        | 10,000               |                       |
| Otter Pond, Bingham, Me                       |        | 10,000               |                       |
| Jewett Pond, Bingham, Me                      |        | 5,000                |                       |
| Reno Pond, Bingham, Me                        |        | 5,000                |                       |
| Clear Pond, Bingham, Me                       |        | 5,000                |                       |
| Rowe Pond, Bingham, Me                        |        | 5,000                |                       |

*Details of distribution—Continued.*

| Species and disposition.                        | Eggs.  | Fry and fingerlings. | Adults and yearlings. |
|---|--------|----------------------|-----------------------|
| <i>Brook trout—Continued.</i>                   |        |                      |                       |
| Pierce Pond, Bingham, Me                        |        | 20,000               |                       |
| Great and Long ponds, Belgrade, Me              |        | 10,000               |                       |
| Webb Pond, Ellsworth, Me                        |        | 10,000               |                       |
| Patten Pond, Ellsworth, Me                      |        | 25,000               |                       |
| Lake Anasagunticook, Canton, Me                 |        | 10,000               |                       |
| Wapskalugan and Moosehorn brooks, Charlotte, Me |        | 5,000                |                       |
| Varnum Pond, Farmington, Me                     |        | 5,000                |                       |
| Clearwater and Worth ponds, Farmington, Me      |        | 10,000               |                       |
| St. George Lake, Thorndike, Me                  |        | 10,000               |                       |
| Pennamaquan Creek, Calais, Me                   |        | 5,000                |                       |
| Meadow Brook, Calais, Me                        |        | 5,000                |                       |
| Wilson Lake, Wilton, Me                         |        | 10,000               |                       |
| Parmachene Lake, Bethel, Me                     |        | 20,000               |                       |
| Craig Pond, Orland, Me                          |        |                      | 5,210                 |
| Craig Brook, East Orland, Me                    |        | 4,578                |                       |
| Water company's reservoir, Belfast, Me          |        | 5,000                |                       |
| Moosehead Lake, Greenville, Me                  |        | 25,000               |                       |
| Jordan Pond, Bar Harbor, Me                     |        | 10,000               |                       |
| Eagle Lake, Bar Harbor, Me                      |        | 10,000               |                       |
| Lake Thompson, Oxford, Me                       |        | 10,000               |                       |
| Branch Pond, Dedham, Me                         |        | 35,000               |                       |
| Holland Pond, Alton, Me                         |        | 15,000               |                       |
| Green Lake, Otis, Me                            |        | 8,644                |                       |
| Israel Creek, Walkersville, Md                  |        |                      | 775                   |
| Lake and stream, Oakland, Md                    |        |                      | 1,000                 |
| Pond and spring, Brownsville, Md                |        |                      | 400                   |
| Turkey Run, Emmitsburg, Md                      |        |                      | 775                   |
| Mountain stream, Swanton, Md                    |        |                      | 1,000                 |
| Henson Branch, Silverhill, Md                   |        |                      | 365                   |
| Spring Branch, Texas, Md                        |        |                      | 32                    |
| Applicants in Maryland                          |        |                      | 409                   |
| Fuller Brook, North Attleboro, Mass             |        | 10,000               |                       |
| North Branch Creek, Springfield, Mass           |        | 10,000               |                       |
| Mistu Pond, Cottage City, Mass                  |        | 10,000               |                       |
| Pond and stream, Cottage City, Mass             |        | 5,000                |                       |
| Lake Quinsigamond, Worcester, Mass              |        | 10,000               |                       |
| State Fish Commission, Worcester, Mass          | 20,000 |                      |                       |
| State Fish Commission, Wilkinsonville, Mass     | 25,000 |                      |                       |
| Samoset Ponds, Fall River, Mass                 |        | 5,000                |                       |
| Mill Brook, Medfield, Mass                      |        | 10,000               |                       |
| Cold Spring Brook, Lawrence, Mass               |        | 5,000                |                       |
| Applicant at Cambridge, Mass                    |        |                      | 100                   |
| Spring Brook, Milford, Mich                     |        | 5,000                |                       |
| Cedar Creek, Pentwater, Mich                    |        | 5,000                |                       |
| Boardman River, Traverse City, Mich             |        | 2,500                |                       |
| Silver and Gold creeks, East Tawas, Mich        |        | 20,000               |                       |
| Witch Lake, Marquette County, Mich              |        | 5,000                |                       |
| Red Run, Dorr, Mich                             |        | 5,000                |                       |
| Burch Creek, Greenville, Mich                   |        | 9,000                |                       |
| Silver Creek, West Harrisonville, Mich          |        | 5,000                |                       |
| Hubbard Lake, West Harrisonville, Mich          |        | 5,000                |                       |
| Vaughn Creek, Emery Junction, Mich              |        | 10,000               |                       |
| Cedar Creek, West Greenbush, Mich               |        | 5,000                |                       |
| Norton Creek, Wixom, Mich                       |        | 5,000                |                       |
| Halfway Creek, New Richmond, Mich               |        | 10,000               |                       |
| Branch of Paint Creek, Oxford, Mich             |        | 5,000                |                       |
| Spring Brook, Eau Claire, Mich                  |        | 5,000                |                       |
| McEwan Creek, Clare, Mich                       |        | 5,000                |                       |
| Silver Creek, Clare, Mich                       |        | 5,000                |                       |
| McKinley Creek, Clare, Mich                     |        | 5,000                |                       |
| Chippewa lakes and streams, Lake Station, Mich  |        | 10,000               |                       |
| Grand River, Hanover, Mich                      |        | 10,000               |                       |
| Nottawasippi Creek, Union City, Mich            |        | 5,000                |                       |
| Coldwater Creek, Freeport, Mich                 |        | 5,000                |                       |
| Boardman River, South Boardman, Mich            |        | 10,000               |                       |
| Kalkaska, Mich                                  |        | 10,000               |                       |
| Boyne River, Elmira, Mich                       |        | 10,000               |                       |
| Little Manistee River, Canfields, Mich          |        | 22,500               |                       |
| Washington River, Washington Harbor, Mich       |        | 7,000                |                       |
| Sturgeon River, Trowbridge, Mich                |        |                      | 154                   |
| Cook Valley Creek, Kellogg, Minn                |        |                      | 3,000                 |
| Trout Brooks, Northfield, Minn                  |        |                      | 11,000                |
| Beaver River, Beaverbay, Minn                   |        | 10,000               |                       |
| Baptism River, Beaverbay, Minn                  |        | 7,000                |                       |
| Shingobe Creek, Walker, Minn                    |        | 5,000                |                       |
| Stuart River, Waldo, Minn                       |        | 10,000               |                       |
| Poplar River, Lutsen, Minn                      |        | 5,000                |                       |
| French River, Duluth, Minn                      |        | 8,000                |                       |
| Sucker River, Duluth, Minn                      |        | 8,000                |                       |
| Tischer Creek, Duluth, Minn                     |        | 6,000                |                       |
| Bear Gulch Creek, Bozeman, Mont                 |        |                      | 3,000                 |
| Beaver Creek, Fort Assiniboine, Mont            |        |                      | 3,000                 |



*Details of distribution—Continued.*

| Species and disposition.                                | Eggs.  | Fry and fingerlings. | Adults and yearlings. |
|---|--------|----------------------|-----------------------|
| <i>Brook trout—Continued.</i>                           |        |                      |                       |
| J. F. Comee, Missoula, Mont. ....                       | 20,000 | -----                | -----                 |
| Walnut Creek, Nebraska City, Nebr. ....                 | -----  | -----                | 4,000                 |
| State Fish Commission, Laconia, N. H. ....              | 20,000 | -----                | -----                 |
| Spring Brooks, Concord, N. H. ....                      | -----  | 20,000               | -----                 |
| Wild Meadow Brooks, Grafton, N. H. ....                 | -----  | 10,000               | -----                 |
| McQueston Brook, Nashua, N. H. ....                     | -----  | 10,000               | -----                 |
| Whitten Pond West Ossipee, N. H. ....                   | -----  | 10,000               | -----                 |
| A. M. Bigelow, Branchville, N. J. ....                  | 20,000 | -----                | -----                 |
| Paulins Kill River, Washingtonville, N. J. ....         | -----  | -----                | 1,000                 |
| J. Minion, Las Vegas, N. Mex. ....                      | 10,000 | -----                | -----                 |
| Harrison Brook, Oneonta, N. Y. ....                     | -----  | -----                | 400                   |
| Oneonta Creek, Oneonta, N. Y. ....                      | -----  | -----                | 800                   |
| Charlotte Creek, Oneonta, N. Y. ....                    | -----  | -----                | 400                   |
| Harrison Brook, Oneonta, N. Y. ....                     | -----  | -----                | 400                   |
| Keyes Brook, Oneonta, N. Y. ....                        | -----  | -----                | 400                   |
| Otego Creek, Oneonta, N. Y. ....                        | -----  | 18,750               | -----                 |
| Elk Creek, Worcester, N. Y. ....                        | -----  | -----                | 800                   |
| Owego Creek, Owego, N. Y. ....                          | -----  | -----                | 800                   |
| Nigger Hollow Swamp, Sherburne, N. Y. ....              | -----  | -----                | 750                   |
| Tiquin, Limon, and Howard brooks, Sherburne, N. Y. .... | -----  | 18,750               | -----                 |
| Montfredy Brook, Syracuse, N. Y. ....                   | -----  | -----                | 800                   |
| Trout Creek, Schenectady, N. Y. ....                    | -----  | -----                | 400                   |
| Van Epps Brook, Schenectady, N. Y. ....                 | -----  | -----                | 400                   |
| Cedarvale and Judd brooks, Syracuse, N. Y. ....         | -----  | 15,000               | -----                 |
| Lishas Kill Brook, Niskayuna, N. Y. ....                | -----  | -----                | 400                   |
| Toughnioga River, De Ruyter, N. Y. ....                 | -----  | 44,000               | 750                   |
| Quaker Brook, Patterson, N. Y. ....                     | -----  | -----                | 800                   |
| Otsdawa Creek, Otego, N. Y. ....                        | -----  | -----                | 800                   |
| Moyer Brook, Frankfort, N. Y. ....                      | -----  | 12,500               | -----                 |
| Richmondville Creek, Richmondville, N. Y. ....          | -----  | 18,750               | -----                 |
| Schenevus Creek, East Worcester, N. Y. ....             | -----  | 12,500               | -----                 |
| Canisteo River, Hornellsville, N. Y. ....               | -----  | 15,000               | -----                 |
| Edwards and Burchard brooks, Waterville, N. Y. ....     | -----  | 18,750               | -----                 |
| Tributaries of Stony Brook, St. Regis Falls, N. Y. .... | -----  | 40,000               | -----                 |
| State Fish Commission, Watertown, N. Y. ....            | -----  | 39,000               | -----                 |
| Spring Brook, Littleton, N. C. ....                     | -----  | -----                | 500                   |
| Applicant at Morrisville, N. C. ....                    | -----  | -----                | 200                   |
| Spring Lake, Sheldon, N. Dak. ....                      | -----  | 5,000                | -----                 |
| Silver Lake, Bellefontaine, Ohio ....                   | -----  | 5,000                | -----                 |
| Spring Lake, Bellefontaine, Ohio ....                   | -----  | 5,000                | -----                 |
| Applicants in Ohio ....                                 | -----  | 9,500                | -----                 |
| Applicant at Junction City, Oreg. ....                  | -----  | -----                | 2,000                 |
| Tobyhanna Creek, Tobyhanna Mills, Pa. ....              | -----  | -----                | 300                   |
| Butternut Creek, Honesdale, Pa. ....                    | -----  | -----                | 300                   |
| Swamp Brook, Honesdale, Pa. ....                        | -----  | -----                | 300                   |
| Middle Creek, Honesdale, Pa. ....                       | -----  | -----                | 300                   |
| Lackawaxen River, Honesdale, Pa. ....                   | -----  | -----                | 600                   |
| Goodrich Brook, Honesdale, Pa. ....                     | -----  | -----                | 300                   |
| Paddy Run, Renovo, Pa. ....                             | -----  | -----                | 300                   |
| Drury Run, Renovo, Pa. ....                             | -----  | -----                | 300                   |
| Pond and stream, Berwindale, Pa. ....                   | -----  | -----                | 200                   |
| Sandy Run, Edgehill, Pa. ....                           | -----  | -----                | 300                   |
| Mill race and pond, Bedford, Pa. ....                   | -----  | -----                | 500                   |
| Clover Creek, Altoona, Pa. ....                         | -----  | -----                | 300                   |
| Valley Creek, Valley Forge, Pa. ....                    | -----  | -----                | 500                   |
| Bear Run, Bear Run, Pa. ....                            | -----  | -----                | 500                   |
| Allegheny River and tributaries, Coudersport, Pa. ....  | -----  | -----                | 1,000                 |
| Crescent Lake, Cocono Summit, Pa. ....                  | -----  | -----                | 300                   |
| Painter Creek, Moosic, Pa. ....                         | -----  | -----                | 300                   |
| Laurel Run, Cresson, Pa. ....                           | -----  | -----                | 300                   |
| Lick Run, McElhattan, Pa. ....                          | -----  | -----                | 500                   |
| Rock Run, McElhattan, Pa. ....                          | -----  | -----                | 200                   |
| Spring Run, McElhattan, Pa. ....                        | -----  | -----                | 300                   |
| Rhodes Branch, New Freedom, Pa. ....                    | -----  | -----                | 300                   |
| Solomon and Adams creeks, Johnstown, Pa. ....           | -----  | -----                | 300                   |
| Spring Creek, Bellefonte, Pa. ....                      | -----  | -----                | 200                   |
| Hagerman Run, Williamsport, Pa. ....                    | -----  | -----                | 600                   |
| Mountain Stream, Wetham, Pa. ....                       | -----  | -----                | 500                   |
| Rattlesnake Run, Wetham, Pa. ....                       | -----  | -----                | 1,100                 |
| Plumb Run, Lockhaven, Pa. ....                          | -----  | -----                | 300                   |
| Beech Creek, Snowshoe, Pa. ....                         | -----  | -----                | 200                   |
| Cook Creek, Troy, Pa. ....                              | -----  | -----                | 300                   |
| Ballard Creek, Troy, Pa. ....                           | -----  | -----                | 300                   |
| Morgan Creek, Troy, Pa. ....                            | -----  | -----                | 300                   |
| Slannera Creek, Susquehanna, Pa. ....                   | -----  | 12,500               | -----                 |
| Starruca Creek, Susquehanna, Pa. ....                   | -----  | 15,000               | -----                 |
| Applicants in Pennsylvania ....                         | -----  | -----                | 1,100                 |
| Bartlett Brook, Providence, R. I. ....                  | -----  | 10,000               | -----                 |
| Applicant at Providence, R. I. ....                     | -----  | 3,000                | -----                 |
| Queens River and tributaries, Kingston, R. I. ....      | -----  | 10,000               | -----                 |
| Little Spearfish Creek, Deadwood, S. Dak. ....          | -----  | 5,000                | -----                 |



*Details of distribution—Continued.*

| Species and disposition.                           | Eggs.   | Fry and fingerlings. | Adults and yearlings. |
|--|---------|----------------------|-----------------------|
| <i>Brook trout—Continued.</i>                      |         |                      |                       |
| South Fork Spearfish Creek, Englewood, S. Dak      |         | 5,000                |                       |
| Whitewood Creek, Englewood, S. Dak                 |         | 15,000               |                       |
| Rapid Creek, Rapid City, S. Dak                    |         | 10,000               |                       |
| Spring Lake, Fairfax, S. Dak                       |         | 5,000                |                       |
| Cascade River, Cascade, S. Dak                     |         | 5,000                |                       |
| Pond and stream, Spearfish, S. Dak                 |         | 5,000                |                       |
| Crow Creek, Spearfish, S. Dak                      |         | 5,000                |                       |
| Horse Creek, Sheridan, S. Dak                      |         | 5,000                |                       |
| Beaver Creek, Buffalo Gap, S. Dak                  |         | 5,000                |                       |
| Falsebottom Creek, Minnesela, S. Dak               |         | 5,000                |                       |
| Rosebud and Rock creeks, Rosebud Agency, S. Dak    |         | 10,000               |                       |
| Lake Creek, Pine Ridge Agency, S. Dak              |         | 8,333                |                       |
| Wolf Creek, Pine Ridge Agency, S. Dak              |         | 8,333                |                       |
| American Horse Creek, Pine Ridge Agency, S. Dak    |         | 8,334                |                       |
| Box Elder Creek, Nemo, S. Dak                      |         | 5,000                |                       |
| Applicants in South Dakota                         |         | 13,000               |                       |
| Stone Creek, Murfreesboro, Tenn                    |         |                      | 90                    |
| Spring Lake, Murfreesboro, Tenn                    |         |                      | 90                    |
| Pine and Falling Water creeks, Watertown, Tenn     |         |                      | 900                   |
| Fall Creek, Hohenwall, Tenn                        |         |                      | 450                   |
| Buffalo River, Linden, Tenn                        |         |                      | 450                   |
| Big Stony Creek, Elizabethton, Tenn                |         |                      | 992                   |
| Martin Creek, Unicoi County, Tenn                  |         |                      | 1,568                 |
| Mill Creek, Unicoi County, Tenn                    |         |                      | 1,000                 |
| Granny Lewis Creek, Unicoi County, Tenn            |         |                      | 1,000                 |
| Crow Branch Fishery, Tenn                          |         |                      | 9,380                 |
| Rock Creek, Rock Creek, Tenn                       |         |                      | 400                   |
| Ponds and springs, Erwin, Tenn                     |         |                      | 921                   |
| Applicants in Tennessee                            |         |                      | 1,728                 |
| Pinewood Lake, Clarksville, Tenn                   |         |                      | 270                   |
| State Fish Commission, Murray, Utah                | 50,000  |                      |                       |
| Orson Saunders, Salt Lake City, Utah               | 5,000   |                      |                       |
| Caspian Lake, Greensboro, Vt                       |         | 49,985               | 3,134                 |
| Little Leach Pond, Averill, Vt                     |         | 20,000               | 2,775                 |
| Henderson Brook, Salisbury, Vt                     |         |                      | 300                   |
| Vermont State Fish Commission, Colebrook, N. H.    | 50,000  |                      |                       |
| F. J. Robinson, North Underhill, Vt                | 5,000   |                      |                       |
| S. L. Griffith, Danby, Vt                          | 109,000 |                      |                       |
| Spring Brook, White River Junction, Vt             |         | 10,000               |                       |
| Frog Pond, Waterford, Vt                           |         | 5,000                |                       |
| Mill Brook, Newport, Vt                            |         | 15,000               |                       |
| Mason Pond, Randolph, Vt                           |         | 5,000                |                       |
| Hatch Brook and pond, Randolph, Vt                 |         | 5,000                |                       |
| Ayer and Peth brooks, Randolph, Vt                 |         | 10,000               |                       |
| Molly Brook, West Danville, Vt                     |         | 10,000               |                       |
| Caledonia Trout Ponds, St. Johnsbury, Vt           |         | 20,000               |                       |
| Hastings Brook, St. Johnsbury, Vt                  |         | 5,000                |                       |
| Passumpsic River, St. Johnsbury, Vt                |         | 2,500                |                       |
| Tributaries of Sleiپر River, St. Johnsbury, Vt     |         | 19,000               |                       |
| Carr, Scales, and Rousing brooks, East Concord, Vt |         | 10,000               |                       |
| Hewitt Brook, Bristol, Vt                          |         | 5,000                |                       |
| Lake Mitchell, West Norwich, Vt                    |         | 50,000               |                       |
| Quinby Mill Pond, Sharon, Vt                       |         | 5,000                |                       |
| Joe Brook, Walden, Vt                              |         | 5,000                |                       |
| Spring Branch, Brownington, Vt                     |         | 10,000               |                       |
| Water Andrick Brook, Passumpsic, Vt                |         | 5,000                |                       |
| Danville, Vt                                       |         | 5,000                |                       |
| Staunton Brook, North Danville, Vt                 |         | 5,000                |                       |
| Craven Brook, North Danville, Vt                   |         | 10,000               |                       |
| Rake Factory Brook, East Barnett, Vt               |         | 5,000                |                       |
| Waterford Brook, Passumpsic, Vt                    |         | 5,000                |                       |
| Lewis Creek, Vergennes, Vt                         |         | 10,000               |                       |
| Branch Brook, South Wallingford, Vt                |         | 10,000               |                       |
| Pico Pond, Rutland, Vt                             |         | 50,000               |                       |
| Sherburne, Vt                                      |         | 49,800               |                       |
| Streams at Stowe, Vt                               |         | 10,000               |                       |
| Groves Brook, Kirby, Vt                            |         | 2,600                |                       |
| Wheelock Brook, Lyndon, Vt                         |         | 5,000                |                       |
| Big Fish Pond, Lyndon Center, Vt                   |         | 10,000               |                       |
| Bean Pond, South Barton, Vt                        |         | 5,000                |                       |
| Summit Pond, South Barton, Vt                      |         | 5,000                |                       |
| Stevens Brook, Barnett, Vt                         |         | 5,000                |                       |
| Baldwin Pond, Starksboro, Vt                       |         | 10,000               |                       |
| Applicants in Vermont                              |         | 15,000               |                       |
| Mountain stream, Linden, Va                        |         |                      | 400                   |
| Darb Creek, Winchester, Va                         |         |                      | 500                   |
| Applicants in Virginia                             |         |                      | 573                   |
| Diamond Lake, Camden, Wash                         |         |                      | 3,000                 |
| Lake Wildwood, New Whatcom, Wash                   |         |                      | 3,000                 |
| Little Spokane River, Spokane, Wash                |         |                      | 5,000                 |
| Ahtanum River, North Yakima, Wash                  |         |                      | 1,000                 |

*Details of distribution—Continued.*

| Species and disposition.                   | Eggs.     | Fry and fingerlings. | Adults and yearlings. |
|--|-----------|----------------------|-----------------------|
| <i>Brook trout—Continued.</i>              |           |                      |                       |
| Touchet River, Dayton, Wash                |           |                      | 1,000                 |
| Chambers Creek, Tacoma, Wash               |           |                      | 250                   |
| Lake Steilacoon, Tacoma, Wash              |           |                      | 250                   |
| F. A. Degler, Cheat Bridge, W. Va          | 25,000    |                      |                       |
| Salt Lick Creek, Terra Alta, W. Va         |           |                      | 500                   |
| Big and Meadow Runs, Huttonsville, W. Va   |           |                      | 1,000                 |
| Spring Lake, Martinsburg, W. Va            |           |                      | 500                   |
| Applicants in West Virginia                |           |                      | 750                   |
| Trout Brook, Woodruff, Wis                 |           |                      | 1,000                 |
| Lake Nebagemain, Lake Nebagemain, Wis      |           | 10,000               |                       |
| Black River, Foxboro, Wis                  |           | 10,000               |                       |
| State Fish Commission, Sheridan, Wyo       | 35,000    |                      |                       |
| Laramie, Wyo                               | 75,000    |                      |                       |
| Brooks and lakes, Bighorn County, Wyo      |           |                      | 4,000                 |
| Bear Tooth Lake, Bighorn County, Wyo       |           |                      | 2,000                 |
| H. M. Phipps, Inverness, Scotland          | 20,000    |                      |                       |
| Total                                      | 534,000   | 1,967,092            | 195,021               |
| <i>Lake trout:</i>                         |           |                      |                       |
| State Fish Commission, Windsor Locks, Conn |           | 25,000               |                       |
| Quonnipaug Lake, New Haven, Conn           |           | 25,000               |                       |
| State Fish Commission, Enfield, Me         | 350,000   |                      |                       |
| Donnell Pond, Franklin, Me                 |           | 55,000               |                       |
| Long Pond, Great Pond, Me                  |           | 40,000               |                       |
| Morrison Lake, Green Lake, Me              |           | 20,000               |                       |
| Rocky Pond, Otis, Me                       |           | 45,000               |                       |
| Green Lake, Otis, Me                       |           | 21,000               |                       |
| Holbrook Pond, Holden, Me                  |           | 45,000               |                       |
| Little Fitz Pond, Holden, Me               |           | 45,000               |                       |
| Phillips Lake, Dedham, Me                  |           | 45,000               |                       |
| Tunk Pond, Sullivan, Me                    |           | 40,000               |                       |
| Schoodic Lake, Schoodic, Me                |           | 150,000              |                       |
| Belgrade Lake, Belgrade, Me                |           | 41,000               |                       |
| Messalouskee Lake, Belgrade, Me            |           | 40,000               |                       |
| Watuppa Lake, Fall River, Mass             |           | 25,000               |                       |
| Lake Huron, Alpena, Mich                   |           | 20,000               | 14,600                |
| East Tawas, Mich                           |           |                      | 15,000                |
| Cheboygan, Mich                            |           |                      | 14,900                |
| Lake Huron, off Scarecrow Island, Mich     |           | 125,000              |                       |
| North Point, Mich                          |           | 125,000              |                       |
| Middle Island, Mich                        |           | 125,000              |                       |
| Thunder Bay Island, Mich                   |           | 500,000              |                       |
| Lake Michigan, Charlevoix, Mich            |           | 1,992,500            | 9,600                 |
| Manistique, Mich                           |           | 987,500              |                       |
| Lake Superior, Bay Mills, Mich             |           | 800,000              |                       |
| Ontonagon, Mich                            |           | 560,000              |                       |
| Long Point, Mich                           |           | 280,000              |                       |
| Firesteel River, Mich                      |           | 280,000              |                       |
| Fourteen-mile Point, Mich                  |           | 280,000              |                       |
| Washington Harbor, Mich                    |           | 280,000              |                       |
| Keystone, Mich                             |           | 210,000              |                       |
| Little Montreal River, Mich                |           | 210,000              |                       |
| Rock Harbor, Mich                          |           | 280,000              |                       |
| Fish Island, Mich                          |           | 140,000              |                       |
| Tobins Harbor, Mich                        |           | 140,000              |                       |
| Todds Harbor, Mich                         |           | 280,000              |                       |
| Hamlin Lake, Ludington, Mich               |           |                      | 15,000                |
| Straits of Mackinac, Mackinaw City, Mich   |           | 2,000,000            | 14,850                |
| Walnut Lake, North Farmington, Mich        |           |                      | 2,700                 |
| State Fish Commission, Reed City, Mich     | 1,500,000 |                      |                       |
| Sault Ste. Marie, Mich                     | 350,000   |                      |                       |
| Portage Lake, Ypsilanti, Mich              |           | 50,000               |                       |
| Union Lake, Commerce, Mich                 |           | 100,000              |                       |
| Pine Lake, Charlevoix, Mich                |           | 500,000              |                       |
| Round Lake, Hanover, Mich                  |           | 20,000               |                       |
| Beaver Lake, Alpena, Mich                  |           | 100,000              |                       |
| Turtle Lake, Alpena County, Mich           |           | 65,000               |                       |
| Eagle Lake, Willmar, Minn                  |           | 28,000               |                       |
| Bear Lake, Akely, Minn                     |           | 10,000               |                       |
| Leech Lake, Walker, Minn                   |           | 25,000               |                       |
| Lake Superior, Duluth, Minn                |           | 2,000,000            |                       |
| Grand Portage, Minn                        |           | 227,500              |                       |
| Hovland, Minn                              |           | 280,000              |                       |
| Beaver Bay, Minn                           |           | 560,000              |                       |
| Lutsen, Minn                               |           | 420,000              |                       |
| Lake Winnisquam, Laconia, N. H.            |           | 30,000               |                       |
| Granite Lake, Hudson Center, N. H.         |           | 20,000               |                       |
| Lake Winnepesaukee, Weirs, N. H.           |           | 112,425              |                       |
| New Found Lake, Bristol, N. H.             |           | 45,000               |                       |

*Details of distribution—Continued.*

| Species and disposition.                                      | Eggs.     | Fry and fingerlings. | Adults and yearlings. |
|---|-----------|----------------------|-----------------------|
| <i>Lake trout—Continued.</i>                                  |           |                      |                       |
| Lake Asquam, Ashland, N. H. ....                              |           | 52,500               |                       |
| Babosic Pond, Amherst, N. H. ....                             |           | 10,000               |                       |
| Dublin Lake, Dublin, N. H. ....                               |           | 5,900                |                       |
| Lake Masabesic, Hillsboro and Rockingham counties, N. H. .... |           | 8,730                |                       |
| Adirondack League Club, Fulton Chain, N. Y. ....              | 300,000   |                      |                       |
| State Fish Commission, Caledonia, N. Y. ....                  | 500,000   |                      |                       |
| Coldspring Harbor, N. Y. ....                                 | 1,000,000 |                      |                       |
| St. Lawrence River, Cape Vincent, N. Y. ....                  |           | 36,200               |                       |
| Lake Ontario, off Grenadier Island, N. Y. ....                |           | 739,600              |                       |
| Tibbetts Point Lighthouse, N. Y. ....                         |           | 1,100,000            |                       |
| Lower Tumbling Run Lake, Pottsville, Pa. ....                 |           | 8,368                |                       |
| State Fish Commission, Murray, Utah. ....                     | 500,000   |                      |                       |
| State Fish Commission, Roxbury, Vt. ....                      | 300,000   |                      |                       |
| Lake Dunmore, Salisbury, Vt. ....                             |           | 50,000               |                       |
| Willoughby Lake, Westmore, Vt. ....                           |           | 20,000               |                       |
| Harvey Pond, Barnett, Vt. ....                                |           | 15,000               |                       |
| Great Averill Pond, Averill, Vt. ....                         |           | 10,000               |                       |
| Stone Pond, Barton, Vt. ....                                  |           | 10,000               |                       |
| Newman Lake, Hauser, Wash. ....                               |           | 14,955               |                       |
| Loon Lake, Loonlake, Wash. ....                               |           | 26,930               |                       |
| Lake Washington, Seattle, Wash. ....                          |           | 21,985               |                       |
| Lake Whatcom, New Whatcom, Wash. ....                         |           | 17,822               |                       |
| Applicant at Wenatchee, Wash. ....                            |           | 5,000                |                       |
| Lake Superior, Bayfield, Wis. ....                            |           | 280,000              |                       |
| Sand Island, Wis. ....  |           | 700,000              |                       |
| Madeline Island, Wis. ....                                    |           | 280,000              |                       |
| Bark Point, Wis. ....   |           | 560,000              |                       |
| Lake Nebagemain, Lake Nebagemain, Wis. ....                   |           | 400,000              |                       |
| Crooked Lake, Woodruff, Wis. ....                             |           | 30,000               |                       |
| State Fish Commission, Laramie, Wyo. ....                     | 200,000   |                      |                       |
| Sheridan, Wyo. ....   | 50,000    |                      |                       |
| Lake Superior, Port Arthur, Ontario, Canada. ....             |           | 304,500              |                       |
| Total .....   | 5,050,000 | 19,577,415           | 86,650                |
| <i>Scotch sea trout:</i>                                      |           |                      |                       |
| Heart Pond, Orland, Me. ....                                  |           |                      | 5,266                 |
| Toddy Pond, Orland, Me. ....                                  |           |                      | 248                   |
| Patten Pond, Orland, Me. ....                                 |           |                      | 18,899                |
| Ellsworth, Me. ....   |           | 20,000               | 27,234                |
| Long Pond, Bar Harbor, Me. ....                               |           | 7,000                |                       |
| G. H. Richards, Wenaumet, Mass. ....                          | 10,000    |                      |                       |
| Big Sandy Pond, Marshfield, Mass. ....                        |           | 8,000                |                       |
| Total .....   | 10,000    | 35,000               | 51,647                |
| <i>Golden trout:</i>  |           |                      |                       |
| Harriman Pond, Dedham, Me. ....                               |           | 6,990                |                       |
| <i>Hybrid trout:</i>  |           |                      |                       |
| Applicant at Cambridge, Mass. ....                            |           |                      | 100                   |
| Caspian Lake, Greensboro, Vt. ....                            |           |                      | 1,859                 |
| Total .....   |           |                      | 1,959                 |
| <i>Grayling:</i>  |           |                      |                       |
| South Platte River, Florissant, Colo. ....                    |           | 1,000                |                       |
| Platte River, Webster, Colo. ....                             |           | 4,500                |                       |
| Frying Pan River, Ruedi, Colo. ....                           |           | 5,000                |                       |
| Eagle River, Berry Station, Colo. ....                        |           | 10,000               |                       |
| East Fork of Big Wood River, Hailey, Idaho. ....              |           |                      | 5,000                 |
| Spring Branch, Manchester, Iowa. ....                         |           | 5,000                |                       |
| Maquoketa River, Forestville, Iowa. ....                      |           | 15,000               |                       |
| Village Creek, Lansing, Iowa. ....                            |           | 15,450               |                       |
| State Fish Commission, Paris, Mich. ....                      | 200,000   |                      |                       |
| Spring Brook, Westbranch, Mich. ....                          |           | 10,000               |                       |
| Pere Marquette River, Baldwin, Mich. ....                     |           | 27,000               |                       |
| Baldwin Creek, Baldwin, Mich. ....                            |           | 19,000               |                       |
| Baptism River, Lake County, Minn. ....                        |           | 14,000               |                       |
| Lester River, Duluth, Minn. ....                              |           | 10,000               |                       |
| Tributaries of Big Hole River, Brown Station, Mont. ....      |           |                      | 5,000                 |
| Elk Creek, Redrock Lake, Mont. ....                           |           | 1,628,100            |                       |
| Elk Lake, Redrock Lake, Mont. ....                            |           | 150,000              |                       |
| Picnic Creek, Redrock Lake, Mont. ....                        |           | 164,000              |                       |
| Bridger Creek, Bozeman, Mont. ....                            |           | 300,000              |                       |
| McKay and Pearson Creeks, Pendleton, Oreg. ....               |           | 41,668               |                       |
| State Fish Commission, Murray, Utah. ....                     | 72,000    |                      |                       |
| Caspian Lake, Greensboro, Vt. ....                            |           | 20,000               |                       |
| Brule River, Winneboujou, Wis. ....                           |           | 10,000               |                       |

*Details of distribution—Continued.*

| Species and disposition.                                   | Eggs.      | Fry and finger-lings. | Adults and yearling. |
|--|------------|-----------------------|----------------------|
| <i>Grayling—Continued.</i>                                 |            |                       |                      |
| State Fish Commission, Sheridan, Wyo .....                 | 50,000     | -----                 | -----                |
| Laramie, Wyo .....   | 50,000     | -----                 | -----                |
| Total .....  | 372,000    | 2,449,718             | 10,000               |
| <i>White-fish:</i>   |            |                       |                      |
| Henry A. Mower, Worcester, Mass .....                      | 300,000    | -----                 | -----                |
| Lake Erie, Monroe, Mich .....                              | -----      | 8,840,000             | -----                |
| Lake Huron, near North Point, Mich .....                   | -----      | 11,000,000            | -----                |
| Scarecrow Island, Mich .....                               | -----      | 9,700,000             | -----                |
| Presque Isle, Mich .....                                   | -----      | 7,000,000             | -----                |
| Sturgeon Point, Mich .....                                 | -----      | 3,500,000             | -----                |
| off Forester, Mich .....                                   | -----      | 3,000,000             | -----                |
| Detour (north shore), Mich .....                           | -----      | 10,000,000            | -----                |
| Lake Michigan, Charlevoix, Mich .....                      | -----      | 16,000,000            | -----                |
| Frankfort, Mich .....                                      | -----      | 16,000,000            | -----                |
| St. James, Mich .....                                      | -----      | 4,000,000             | -----                |
| Lake Superior, off Sault Ste. Marie (east end), Mich ..... | -----      | 6,500,000             | -----                |
| Ontonagon, Mich .....                                      | -----      | 2,800,000             | -----                |
| Grace Harbor, Isle Royale, Mich .....                      | -----      | 2,200,000             | -----                |
| Detroit River, off Belle Isle, Detroit, Mich .....         | -----      | 58,000,000            | -----                |
| Lake St. Clair, off Belle Isle, Detroit, Mich .....        | -----      | 8,000,000             | -----                |
| Thunder Bay, off North Point, Mich .....                   | -----      | 2,300,000             | -----                |
| St. Marys River, off Sault Ste. Marie, Mich .....          | -----      | 3,500,000             | -----                |
| Whitefish Bay, off Tequamenon Island, Mich .....           | -----      | 5,000,000             | -----                |
| Lake Superior, off Soudic Island, Minn .....               | -----      | 400,000               | -----                |
| State Fish Commission, Plymouth, N. H. ....                | 500,000    | -----                 | -----                |
| St. Lawrence River, Cape Vincent, N. Y .....               | -----      | 22,000,000            | -----                |
| State Fish Commission, Caledonia, N. Y .....               | 10,000,000 | -----                 | -----                |
| Lake Ontario, off Grenadier Island, N. Y .....             | -----      | 5,000,000             | -----                |
| Lake Erie, Peach Point Reef, off Put-in Bay, Ohio .....    | -----      | 6,580,000             | -----                |
| Buckeye Island Reef, off Put-in Bay, Ohio .....            | -----      | 3,600,000             | -----                |
| West Sister Island Reef, off Put-in Bay, Ohio .....        | -----      | 5,250,000             | -----                |
| Rattlesnake Island Reef, off Put-in Bay, Ohio .....        | -----      | 8,360,000             | -----                |
| North Bass Island Reef, off Put-in Bay, Ohio .....         | -----      | 23,000,000            | -----                |
| Middle Bass Island Reef, off Put-in Bay, Ohio .....        | -----      | 10,100,000            | -----                |
| Niagara Reef, off Put-in Bay, Ohio .....                   | -----      | 5,600,000             | -----                |
| Starve Island Reef, off Put-in Bay, Ohio .....             | -----      | 5,600,000             | -----                |
| Ballast Island Reef, off Put-in Bay, Ohio .....            | -----      | 4,800,000             | -----                |
| Moore Point Reef, off Put-in Bay, Ohio .....               | -----      | 4,320,000             | -----                |
| Sugar Island Reef, off Put-in Bay, Ohio .....              | -----      | 2,000,000             | -----                |
| Green Island Reef, off Put-in Bay, Ohio .....              | -----      | 3,250,000             | -----                |
| Kelly Island Reef, Erie County, Ohio .....                 | -----      | 2,560,000             | -----                |
| Put-in Bay, east side, Ohio .....                          | -----      | 4,130,000             | -----                |
| Port Clinton, Ohio .....                                   | -----      | 5,600,000             | -----                |
| Toledo, Ohio .....   | -----      | 6,300,000             | -----                |
| State Fish Commission, Erie, Pa .....                      | 5,832,000  | -----                 | -----                |
| Silver Creek Lake, Pottsville, Pa .....                    | -----      | 256,000               | -----                |
| Lake Champlain, Alburg, Vt .....                           | -----      | 400,000               | -----                |
| Lake Washington, Seattle, Wash .....                       | -----      | 160,000               | -----                |
| Lake Superior, Port Wing, Wis .....                        | -----      | 4,200,000             | -----                |
| Bark Bay, Wis .....  | -----      | 4,200,000             | -----                |
| Sand Bay, Wis .....  | -----      | 4,200,000             | -----                |
| Port Arthur, Ontario, Canada .....                         | -----      | 2,000,000             | -----                |
| Total .....  | 16,632,000 | 321,206,000           | -----                |
| <i>Pike perch:</i>   |            |                       |                      |
| Lake Maxinkuckee, Culver, Ind .....                        | -----      | 800,000               | -----                |
| Blue River, Rome City, Ind .....                           | -----      | 500,000               | -----                |
| Mississinewa Lake, Ridgeville, Ind .....                   | -----      | 500,000               | -----                |
| State Fish Commission, Boston, Mass .....                  | -----      | 1,000,000             | -----                |
| Detroit, Mich .....  | 25,000,000 | -----                 | -----                |
| Merrimac River, Concord, N. H. ....                        | -----      | 1,000,000             | -----                |
| Raquette River, Potsdam, N. Y .....                        | -----      | 900,000               | -----                |
| St. Lawrence River, Cape Vincent, N. Y .....               | -----      | 19,500,000            | -----                |
| Thompson & Warner's Lake, Altamont, N. Y .....             | -----      | 900,000               | -----                |
| Spring Lake, Cleveland, Ohio .....                         | -----      | 1,000,000             | -----                |
| Grand River, Eagleville, Ohio .....                        | -----      | 1,000,000             | -----                |
| Western Reservoir, Midland City, Ohio .....                | -----      | 1,000,000             | -----                |
| Baker Lake, Mechanicsburg, Ohio .....                      | -----      | 500,000               | -----                |
| Tuscarawas River, Zoar, Ohio .....                         | -----      | 1,000,000             | -----                |
| Lake Erie, Peach Point Reef, off Put-in Bay, Ohio .....    | -----      | 6,600,000             | -----                |
| Rattlesnake Island Reef, off Put-in Bay, Ohio .....        | -----      | 5,700,000             | -----                |
| Ballast Island Reef, off Put-in Bay, Ohio .....            | -----      | 5,200,000             | -----                |
| North Bass Island Reef, off Put-in Bay, Ohio .....         | -----      | 3,000,000             | -----                |
| Susquehanna River, Susquehanna, Pa .....                   | -----      | 2,000,000             | -----                |
| State Fish Commission, St. Johnsbury, Vt .....             | -----      | 12,600,000            | -----                |
| Total .....  | 25,000,000 | 64,700,000            | -----                |

*Details of distribution—Continued.*

| Species and disposition.                                   | Adults<br>and<br>yearlings. | Species and disposition.                              | Adults<br>and<br>yearlings. |
|--|-----------------------------|---|-----------------------------|
| <i>Cat-fish:</i>   |                             | <i>Black bass—Continued.</i>                          |                             |
| Mississippi River, Bellevue, Iowa                          | 4,000                       | Warm Springs Branch, Bulloch-<br>ville, Ga. ....      | 47                          |
| Lake Irvine, Church Ferry, N.<br>Dak. ....                 | 10                          | Applicants in Georgia. ....                           | 3,336                       |
| Weiremiller Lake, Church Fer-<br>ry, N. Dak. ....          | 14                          | Rose Lake, Iuka, Ill. ....                            | 100                         |
| Total. ....  | 4,024                       | Electric Light Lake, Carters-<br>ville, Ill. ....     | 100                         |
| <i>Pike:</i>   |                             | Millpond, Paris, Ill. ....                            | 150                         |
| Mississippi River, Bellevue, Iowa                          | 5,000                       | Horseshoe Lake, Carbondale, Ill. ....                 | 100                         |
| <i>Pickereel:</i>  |                             | Bang Lake, Wauconda, Ill. ....                        | 200                         |
| Devils Lake, Devils Lake, N. Dak                           | 185                         | Little Creek, Marshall, Ill. ....                     | 200                         |
| <i>Yellow perch:</i>                                       |                             | Applicants in Illinois. ....                          | 640                         |
| Mississippi River, Bellevue, Iowa                          | 8,000                       | Leatherwood Creek, Bedford,<br>Ind. ....              | 400                         |
| Devils Lake, Devils Lake, N. Dak                           | 100                         | Upper Salt Creek, Bedford, Ind. ....                  | 550                         |
| Lake Irvine, Church Ferry, N.<br>Dak. ....                 | 35                          | Guthrie Creek, Bedford, Ind. ....                     | 200                         |
| Weiremiller Lake, Church Fer-<br>ry, N. Dak. ....          | 35                          | Indian Creek, Bedford, Ind. ....                      | 400                         |
| Total. ....  | 8,170                       | Williams, Ind. ....                                   | 100                         |
| <i>Black bass:</i>   |                             | Owensburg, Ind. ....                                  | 500                         |
| Cahaba River, Birmingham, Ala. ....                        | 400                         | White River, Bedford, Ind. ....                       | 350                         |
| Savage & Willetts Lake, Annis-<br>ton, Ala. ....           | 200                         | Castleton, Ind. ....                                  | 150                         |
| McCarty Millpond, Ethelville,<br>Ala. ....                 | 150                         | Noblesville, Ind. ....                                | 200                         |
| Barren Fork Flint River, New-<br>market, Ala. ....         | 200                         | Spring Lake, Evansville, Ind. ....                    | 150                         |
| Davidson Lake, Uniontown, Ala. ....                        | 300                         | Cook Park Lake, Evansville, Ind. ....                 | 150                         |
| Biving Lake, Dunham, Ala. ....                             | 200                         | Salt Creek, Heltonville, Ind. ....                    | 250                         |
| Alabama River, Montgomery,<br>Ala. ....                    | 250                         | Patoka River, Huntingburg, Ind. ....                  | 200                         |
| Guice Fish Lake, Eufaula, Ala. ....                        | 800                         | Stone Quarry Lake, Kokomo,<br>Ind. ....               | 250                         |
| Applicants in Alabama. ....                                | 2,500                       | Raccoon Creek, Ladoga, Ind. ....                      | 100                         |
| Spring Lake, Tucson, Ariz. ....                            | 100                         | Wabash River, Williamsport, Ind                       | 200                         |
| San Juan Lake, Bisbee, Ariz. ....                          | 75                          | Tippecanoe River, Monticello,<br>Ind. ....            | 300                         |
| Indian School Lake, Phoenix,<br>Ariz. ....                 | 200                         | Brookville and Metamora Canal,<br>Metamora, Ind. .... | 200                         |
| Liveoak Creek, Flagstaff, Ariz. ....                       | 100                         | Fish Trap Lake, Laporte, Ind. ....                    | 250                         |
| Spring Lake, Benton, Ark. ....                             | 400                         | Sugar and Young creeks, Frank-<br>lin, Ind. ....      | 700                         |
| Grayson Millpond, Barham, Ark.                             | 150                         | Wabash Pond, Vincennes, Ind. ....                     | 250                         |
| Railroad reservoir, Ashdown,<br>Ark. ....                  | 200                         | Downey Lake, Princeton, Ind. ....                     | 100                         |
| Big Lake, Biglake, Ark. ....                               | 200                         | Pretty Lake, Plymouth, Ind. ....                      | 250                         |
| Upper Blackfish Lake, Earle,<br>Ark. ....                  | 200                         | Spring Lake, Knightstown, Ind. ....                   | 325                         |
| Applicants in Arkansas. ....                               | 750                         | Lake Maxinkuckee, Culver, Ind.                        | 5,198                       |
| Big Spring Lake, Kiowa, Colo. ....                         | 100                         | Waterworks Lake, Bloomington,<br>Ind. ....            | 150                         |
| Reservoir, Pueblo, Colo. ....                              | 200                         | Kale Lake, South Bend, Ind. ....                      | 200                         |
| Lake Minnequan, Pueblo, Colo. ....                         | 200                         | Applicants in Indiana. ....                           | 2,200                       |
| Herrick Lake, Littleton, Colo. ....                        | 100                         | Pecan Creek, Gwendale, Ind. T. ....                   | 100                         |
| Marston Lake, Denver, Colo. ....                           | 200                         | Simpson Spring Branch, Ponto-<br>toc, Ind. T. ....    | 200                         |
| Lake Wauconda, Perry Park,<br>Colo. ....                   | 100                         | Applicants in Indian Territory. ....                  | 400                         |
| Applicants in Colorado. ....                               | 140                         | Maquoketa River, Manchester,<br>Iowa. ....            | 1,800                       |
| Paper Millpond, Seymour, Conn. ....                        | 600                         | Forestville,<br>Iowa. ....                            | 500                         |
| Little River, Seymour, Conn. ....                          | 350                         | Monticello,<br>Iowa. ....                             | 300                         |
| Lake Wenonscopomus, Lakeville,<br>Conn. ....               | 500                         | Lake Edgewood, Corning, Iowa. ....                    | 450                         |
| Applicants in Connecticut. ....                            | 200                         | Plum Creek, Earlville, Iowa. ....                     | 300                         |
| Chesapeake and Delaware Canal,<br>Delaware City, Del. .... | 300                         | North River, Winterset, Iowa. ....                    | 500                         |
| State Fish Commission, Wilming-<br>ton, Del. ....          | 500                         | Middle River, Winterset, Iowa. ....                   | 500                         |
| Millpond, Rome, Ga. ....                                   | 100                         | Silver Creek, Dewitt, Iowa. ....                      | 200                         |
| Ruby Lake, Fort Valley, Ga. ....                           | 100                         | Vernon Spring Millpond, Cresco,<br>Iowa. ....         | 900                         |
| Yahoola Creek, Gainesville, Ga. ....                       | 100                         | Turkey River, West Union, Iowa. ....                  | 300                         |
| Lake Juliette, Cedartown, Ga. ....                         | 100                         | Frazer and Lefinwell lakes,<br>Wheatland, Iowa. ....  | 200                         |
| Turkey Creek, Carrollton, Ga. ....                         | 200                         | Shell Rock River, Northwood,<br>Iowa. ....            | 500                         |
| Spring Lake, Tunnel Hill, Ga. ....                         | 400                         | Lake Okoboji, Spirit Lake, Iowa. ....                 | 10,000                      |
| Ward Creek, Jasper, Ga. ....                               | 100                         | Cedar River, Cedar Rapids, Iowa. ....                 | 5,250                       |
| Wimberley Millpond, Lumpkin,<br>Ga. ....                   | 100                         | Clear Lake, Clearlake, Iowa. ....                     | 300                         |
| Clamdale Lake, Washington, Ga. ....                        | 100                         | Applicant in Iowa. ....                               | 1,740                       |
| Swift Creek, Macon, Ga. ....                               | 200                         | Mississippi River, Bellevue, Iowa                     | 5,000                       |
| McCall Lakes, Macon, Ga. ....                              | 500                         | Silver Lake, Agra, Kans. ....                         | 140                         |
| State Fish Commission, La-<br>grange, Ga. ....             | 500                         | Beaver Creek, Leoti, Kans. ....                       | 140                         |
|  |                             | Spring Creek Lake, Smith Cen-<br>ter, Kans. ....      | 140                         |
|  |                             | Baldwin Creek, Manhattan, Kans. ....                  | 140                         |
|  |                             | Sevenmile Creek, Manhattan,<br>Kans. ....             | 140                         |
|  |                             | Eureka Lake, Manhattan, Kans. ....                    | 140                         |
|  |                             | Wildcat Creek, Manhattan, Kans. ....                  | 210                         |



*Details of distribution—Continued.*

| Species and disposition.                            | Adults and yearlings. | Species and disposition.                  | Adults and yearlings. |
|---|-----------------------|---|-----------------------|
| <i>Black bass—Continued.</i>                        |                       | <i>Black bass—Continued.</i>              |                       |
| Deep Creek, Manhattan, Kans.                        | 140                   | Hamlin Lake, Ludington, Mich.             | 135                   |
| McDowell Creek, Manhattan, Kans.                    | 210                   | Little Big Stone Lake, Evart, Mich.       | 135                   |
| Willow Lake, Baxter Springs, Kans.                  | 100                   | Clark Lake, Clark Lake, Mich.             | 125                   |
| Hazeldell Lake, Garnett, Kans.                      | 140                   | Round Lake, Hanover, Mich.                | 125                   |
| Crooked Creek, Fowler, Kans.                        | 100                   | Murray Lake, Ypsilanti, Mich.             | 85                    |
| Hinchy Creek, Ellsworth, Kans.                      | 140                   | Rawson Lake, Schoolcraft, Mich.           | 300                   |
| Little Arkansas River, Wichita, Kans.               | 200                   | Pine River, Alma, Mich.                   | 200                   |
| C., R. I. and P. R. R. reservoir, Herrington, Kans. | 140                   | Black Lake, Onaway, Mich.                 | 125                   |
| Spring Creek, Atchison, Kans.                       | 140                   | Stony Lake, Oxford, Mich.                 | 85                    |
| Forest Lake, Bonner Springs, Kans.                  | 200                   | Pentwater Lake, Pentwater, Mich.          | 135                   |
| Applicants in Kansas.                               | 4,845                 | Big Lake, Gaylord, Mich.                  | 135                   |
| Spring Lake, Peewee Valley, Ky.                     | 200                   | Caribou Lake, Duluth, Minn.               | 1,000                 |
| Fennessy Lake, Culberson, Ky.                       | 100                   | Conocia Lake, Duluth, Minn.               | 1,000                 |
| Spring Lake, Anchorage, Ky.                         | 200                   | Sevenmile Lake, Fulda, Minn.              | 1,000                 |
| Cemetery Lake, Milldale, Ky.                        | 100                   | Big Lake, Barnum, Minn.                   | 1,000                 |
| Cadle Lake, Somerset, Ky.                           | 200                   | Sexton Lake, Hazlehurst, Miss.            | 100                   |
| Elkhorn Creek, Frankfort, Ky.                       | 100                   | Idlewild Lake, Hazlehurst, Miss.          | 100                   |
| Stoner Creek, Winchester, Ky.                       | 100                   | Lake Ann, Hazlehurst, Miss.               | 100                   |
| Howard Lower Creek, Winchester, Ky.                 | 100                   | Lake Leroy, Hazlehurst, Miss.             | 100                   |
| Water company's lake, Winchester, Ky.               | 300                   | Chataqua Lake, Crystal Springs, Miss.     | 250                   |
| Spring Lakes, Winchester, Ky.                       | 300                   | Trinity Creek, Osyka, Miss.               | 250                   |
| Clark County Poorhouse lake, Winchester, Ky.        | 100                   | Spring Creek, Waterford, Miss.            | 200                   |
| Spring Lake, Lebanon, Ky.                           | 100                   | Spring Lake, Canton, Miss.                | 250                   |
| Lake Ellerslie, Lexington, Ky.                      | 300                   | Forest Home Lake, Fayette, Miss.          | 100                   |
| Spring Lake, Nicholasville, Ky.                     | 100                   | Millpond, Silver, Miss.                   | 200                   |
| Byars Lake, Guthrie, Ky.                            | 200                   | Cade Lake, Jackson, Miss.                 | 150                   |
| Spring Lake, Paducah, Ky.                           | 200                   | Spring Lake, Jackson, Miss.               | 200                   |
| Cemetery Lake, Newport, Ky.                         | 100                   | Factory Pond, Meridian, Miss.             | 250                   |
| Crystal Lake, Ryland, Ky.                           | 150                   | Park Lake, Tupelo, Miss.                  | 100                   |
| Applicants in Kentucky.                             | 4,900                 | Horseshoe Lake, Macon, Miss.              | 400                   |
| Sandy Creek, Clinton, La.                           | 600                   | Rose Lake, Oxford, Miss.                  | 250                   |
| Bayou Macon, Wisner, La.                            | 100                   | Applicants in Mississippi.                | 5,746                 |
| St. George Lake, Schriber, La.                      | 200                   | Big River, Irondale, Mo.                  | 200                   |
| Black River, New Orleans, La.                       | 200                   | Springwater Lake, Independence, Mo.       | 140                   |
| Cypress Brake Lake, Bastrop, La.                    | 200                   | Dickinson Lake, Independence, Mo.         | 140                   |
| Chaplin Lake, Natchitoches, La.                     | 200                   | Crisp Lake, Independence, Mo.             | 100                   |
| Lake Julia, Bermuda, La.                            | 200                   | Chick Lake, Excelsior Springs, Mo.        | 140                   |
| Applicants in Louisiana.                            | 950                   | Cutoff Lake, Brunswick, Mo.               | 280                   |
| Little Youghiogheny River, Oakland, Md.             | 500                   | Park Lake, Clinton, Mo.                   | 140                   |
| Chevy Chase Lake, Montgomery County, Md.            | 100                   | Park Lake, Noel, Mo.                      | 100                   |
| Potomac River, Woodmont, Md.                        | 500                   | Hampton Spring Lake, Seneca, Mo.          | 100                   |
| Applicants in Maryland.                             | 425                   | Hickory Creek, Neosho, Mo.                | 1,685                 |
| Horn Pond, Woburn, Mass.                            | 300                   | Applicants in Missouri.                   | 1,050                 |
| Connecticut River, Holyoke, Mass.                   | 300                   | Oberfelder Lake, Lodgepole, Nebr.         | 500                   |
| Cannon Lake, Sharon, Mass.                          | 300                   | Spring Lake, Humphreys, Nebr.             | 550                   |
| Mabnessett Pond, West Chelmsford, Mass.             | 300                   | Van Sickle Lake, McCook, Nebr.            | 100                   |
| Triangle Pond, Sandwich, Mass.                      | 500                   | Applicants in Nebraska.                   | 1,150                 |
| Segreganset River, Segreganset, Mass.               | 300                   | Dark Pond, Harrisville, N. H.             | 490                   |
| Applicants in Massachusetts.                        | 75                    | Spring Lake, Spring Lake, N. J.           | 200                   |
| Devils Lake, Devils Lake, Mich.                     | 200                   | State Fish Commission, Jersey City, N. J. | 8,400                 |
| Loon Lake, Wixom, Mich.                             | 80                    | Sunset Lake, Sewell, N. J.                | 300                   |
| Pleasant Lake, Leslie, Mich.                        | 250                   | Mirror Lake, Browns Mills, N. J.          | 500                   |
| Baldwin and Burgess Lakes, Greenville, Mich.        | 135                   | Applicants in New Jersey.                 | 600                   |
| Lake Como, Greenville, Mich.                        | 135                   | Spring Lake, Las Vegas, N. Mex.           | 200                   |
| Turk Lake, Greenville, Mich.                        | 135                   | Baker Pond, Fayetteville, N. C.           | 400                   |
| Fish Lake, Greenville, Mich.                        | 135                   | Stewart Pond, Charlotte, N. C.            | 100                   |
| Woodbeck Lake, Greenville, Mich.                    | 135                   | Applicants in North Carolina.             | 100                   |
| Twin and Long Lakes, Greenville, Mich.              | 135                   | Gordon Lake, St. John, N. Dak.            | 300                   |
| Lake Bawbeese, Hillsdale, Mich.                     | 125                   | Sargent Lake, Amenia, N. Dak.             | 400                   |
| Bear Lake, Clarion, Mich.                           | 135                   | Spiritwood Lake, Jamestown, N. Dak.       | 2,900                 |
| Lake Huron, Alpena, Mich.                           | 125                   | Blanchard Lake, Blanchard, N. Dak.        | 200                   |
| Long Lake, Alpena, Mich.                            | 200                   | Mayville Reservoir, Mayville, N. Dak.     | 225                   |
| Fox Lake and Lake Harbor, Muskegon, Mich.           | 265                   | Stump Lake, Lakota, N. Dak.               | 1,000                 |
| Big Platt Lake, Benzonia, Mich.                     | 135                   | Devils Lake, Devils Lake, N. Dak.         | 1,630                 |
| Cheboygan River, Cheboygan, Mich.                   | 135                   | Harmonson Lake, Devils Lake, N. Dak.      | 200                   |
|   |                       | Sweetwater Lake, Devils Lake, N. Dak.     | 200                   |
|   |                       | Weiremiller Lake, Church Ferry, N. Dak.   | 290                   |



*Details of distribution—Continued.*

| Species and disposition.                        | Adults and yearlings. | Species and disposition.                   | Adults and yearlings. |
|---|-----------------------|--|-----------------------|
| <i>Black bass—Continued.</i>                    |                       | <i>Black bass—Continued.</i>               |                       |
| Lake Irvine, Church Ferry, N. Dak.              | 260                   | Perkiomen Creek, Yerkess Station, Pa.      | 100                   |
| Hanson Reservoir, Church Ferry, N. Dak.         | 25                    | Conococheague Creek, Marion, Pa.           | 100                   |
| Lewis Pond, Church Ferry, N. Dak.               | 25                    | Silver Lake, Montrose Pa.                  | 150                   |
| McKinney Lake, Church Ferry, N. Dak.            | 25                    | Rose Lake, Andrews Settlement, Pa.         | 100                   |
| Lake Metigosha, Bottineau, N. Dak.              | 400                   | Tidall Mill Pond, Rimerton, Pa.            | 35                    |
| Fish Lake, Rolla, N. Dak.                       | 300                   | Ridley Creek, Chester, Pa.                 | 100                   |
| Willow Lake, Rolla, N. Dak.                     | 300                   | Folly Farm Lake, Elkins, Pa.               | 100                   |
| Steel Ranch Spring, Rolla, N. Dak.              | 75                    | Spring Creek, Cherrytree, Pa.              | 100                   |
| Ueland Lake, Edgely, N. Dak.                    | 25                    | Harney Lake, Shawanese, Pa.                | 300                   |
| Perkins Lake, Oakes, N. Dak.                    | 300                   | Susquehanna River, Georgetown, Pa.         | 150                   |
| Forman Reservoir, Forman, N. Dak.               | 300                   | Liverpool, Pa.                             | 100                   |
| Applicants in North Dakota.                     | 100                   | Crystal and Norton lakes, Carbondale, Pa.  | 300                   |
| Stillwater Creek, Pleasant Hill, Ohio.          | 50                    | Lake Ariel, Ariel, Pa.                     | 200                   |
| Stillwater Creek, Dayton, Ohio.                 | 200                   | Applicants in Pennsylvania.                | 100                   |
| Bush and McCulloch creeks, McCulloch, Ohio.     | 200                   | State Fish Commission, Western, R. I.      | 1,000                 |
| Lake Anna, Barberton, Ohio.                     | 200                   | State Fish Commission, Providence, R. I.   | 1,000                 |
| Raccoon Creek, Newark, Ohio.                    | 100                   | Applicant at Charleston, S. C.             | 100                   |
| South Fork Licking River, Newark, Ohio.         | 100                   | Big Stone Lake, Wilnot, S. Dak.            | 800                   |
| North Fork Licking River, Newark, Ohio.         | 100                   | James River, Mitchell, S. Dak.             | 250                   |
| Rocky Fork Licking River, Newark, Ohio.         | 100                   | Scotland, S. Dak.                          | 400                   |
| Twin Lakes, Earleville, Ohio.                   | 200                   | Lake Campbell, Brookings, S. Dak.          | 500                   |
| Dohner Lake, Doylestown, Ohio.                  | 200                   | Lake Hendricks, Brookings, S. Dak.         | 1,000                 |
| Cliff Lake, Springfield, Ohio.                  | 200                   | Lake Kampeska, Watertown, S. Dak.          | 1,400                 |
| Springfield Lake, Akron, Ohio.                  | 200                   | Sylvan Lake, Custer, S. Dak.               | 600                   |
| West Branch Mill Creek, Glendale, Ohio.         | 200                   | Lake Madison, Madison, S. Dak.             | 700                   |
| Muskingum River, Dresden, Ohio.                 | 200                   | Applicants in South Dakota.                | 2,950                 |
| Big Miami River, Franklin, Ohio.                | 200                   | Buffalo River, Perryville, Tenn.           | 150                   |
| Little Miami River, Columbia, Ohio.             | 200                   | Spring Lake, Woodstock, Tenn.              | 250                   |
| Little Miami River, Waynesville, Ohio.          | 200                   | Blueback Creek, Centerville, Tenn.         | 200                   |
| Hopkins Lake, Willoughby, Ohio.                 | 100                   | Swan River, Centerville, Tenn.             | 200                   |
| Whitewater River, Harrison, Ohio.               | 300                   | Lambs Fork Creek, Del Rio, Tenn.           | 100                   |
| Applicants in Ohio.                             | 1,325                 | Cosby Creek, Del Rio, Tenn.                | 100                   |
| Indian Creek, Woodward, Okla.                   | 100                   | Water company's lake, Jackson, Tenn.       | 200                   |
| Spring Lake, Woodward, Okla.                    | 200                   | Applicants in Tennessee.                   | 1,200                 |
| Spring Creek, Woodward, Okla.                   | 100                   | Lake Blanche, Austin, Tex.                 | 500                   |
| Ivanhoe Creek, Shattuck, Okla.                  | 300                   | Walnut Springs, Austin, Tex.               | 100                   |
| Crutcho Creek, Oklahoma, Okla.                  | 200                   | Llano River, Austin, Tex.                  | 1,000                 |
| Applicants in Oklahoma.                         | 1,025                 | Llano and Colorado rivers, Kingsland, Tex. | 5,000                 |
| Weidner Millpond, Reading, Pa.                  | 425                   | Quoin Creek, Manchaca, Tex.                | 100                   |
| Reservoir, Phoenixville, Pa.                    | 100                   | Golden Lake, Manchaca, Tex.                | 5,000                 |
| Lake Taminent, East Stroudsburg, Pa.            | 150                   | Little Brazos River, Hearne, Tex.          | 2,500                 |
| Mud Run, East Stroudsburg, Pa.                  | 150                   | Spring Lake, Hearne, Tex.                  | 500                   |
| Hunter Range Lake, East Stroudsburg, Pa.        | 200                   | Fin and Feather Club Lake, Hutchins, Tex.  | 2,050                 |
| Keeney Lake, New Freedom, Pa.                   | 100                   | Spring Lake, Holland, Tex.                 | 100                   |
| Wissahickon Creek, Penlynn, Pa.                 | 100                   | Wallace Lake, Moore, Tex.                  | 300                   |
| Ambier, Pa.                                     | 100                   | Moore Lake, Moore, Tex.                    | 50                    |
| Cloverly Farm Lake, Westchester, Pa.            | 50                    | Spring Lake, Vernon, Tex.                  | 100                   |
| French Creek, St. Peters, Pa.                   | 100                   | Elmendorf Lake, San Antonio, Tex.          | 1,000                 |
| Juniata River, Everett, Pa.                     | 200                   | San Pedro Springs, San Antonio, Tex.       | 350                   |
| Huntingdon, Pa.                                 | 300                   | Spring Lake, Ennis, Tex.                   | 300                   |
| Shade Creek, Shadegap, Pa.                      | 100                   | Guadalupe River, Kerrville, Tex.           | 3,000                 |
| Schuylkill River, Birdsboro, Pa.                | 150                   | Cuero, Tex.                                | 4,700                 |
| Conneaut River, Conneautville, Pa.              | 100                   | Spring Lake, Valentine, Tex.               | 200                   |
| Big and Little Conewago Creeks, New Oxford, Pa. | 100                   | Hondo Creek, Hondo, Tex.                   | 2,500                 |
| Oswago Creek, Shinglehouse, Pa.                 | 100                   | Spring Lake, Spofford, Tex.                | 500                   |
| Blacklog Creek, Rockhill, Pa.                   | 100                   | San Gabriel River, Georgetown, Tex.        | 1,600                 |
| Aughwick Creek, Rockhill, Pa.                   | 100                   | Spring Lake, Amarillo, Tex.                | 500                   |
| Shirleysburg, Pa.                               | 100                   | Lake McDonough, Phelps, Tex.               | 500                   |
|   |                       | Spring Lake, Waco, Tex.                    | 200                   |
|   |                       | Day Lake, Waco, Tex.                       | 500                   |
|   |                       | Lake Eloise, Waco, Tex.                    | 500                   |
|   |                       | Washita River, Canadian, Tex.              | 3,000                 |
|   |                       | Gageby Creek, Canadian, Tex.               | 1,500                 |
|   |                       | Spring Brook, Canadian, Tex.               | 500                   |

*Details of distribution—Continued.*

| Species and disposition.                          | Adults and year-lings. | Species and disposition.                         | Adults and year-lings. |
|---|------------------------|--|------------------------|
| <i>Black bass—Continued.</i>                      |                        | <i>Small-mouth black bass:</i>                   |                        |
| Sand Creek, Canadian, Tex.....                    | 500                    | State Fish Commission, Westerly, R. I.....       | 200                    |
| Grigsby Creek, Canadian, Tex.....                 | 1,000                  |  |                        |
| Lambert Creek, Canadian, Tex.....                 | 500                    | <i>Crappie:</i>                                  |                        |
| South Concho River, San Angelo, Tex.....          | 150                    | State Fish Commission, Wilmington, Del.....      | 500                    |
| Little Joshua Creek, Welfare, Tex.....            | 300                    | Murray Hill Lake, Augusta, Ga.....               | 100                    |
| Colony Fork Reservoir, Ranger, Tex.....           | 400                    | Horseshoe Lake, Wynwood, Ind. T.....             | 200                    |
| Spring Creek, Marfa, Tex.....                     | 1,700                  | Applicants in Indian Territory.....              | 200                    |
| Green Creek, Clairette, Tex.....                  | 2,500                  | Lake Okoboji, Spirit Lake, Iowa.....             | 1,375                  |
| Bosque River, Clairette, Tex.....                 | 5,000                  | Upper Iowa River, Limesprings, Iowa.....         | 500                    |
| Fishing Club Lake, Gatesville, Tex.....           | 300                    | Maquoketa River, Manchester, Iowa.....           | 1,500                  |
| Claude Lake, Claude, Tex.....                     | 1,725                  | Clear Lake, Clearlake, Iowa.....                 | 10,500                 |
| Nueces River, Cotulla, Tex.....                   | 2,000                  | Clear River, Orchard, Iowa.....                  | 300                    |
| Sweetwater Creek, Sweetwater, Tex.....            | 725                    | Cedar Rapids, Iowa.....                          | 7,300                  |
| Iatan Lake, Iatan, Tex.....                       | 800                    | Middle River, Winterset, Iowa.....               | 500                    |
| Spring Creek, Colorado, Tex.....                  | 200                    | North River, Winterset, Iowa.....                | 200                    |
| Spring Lake, Richland, Tex.....                   | 350                    | Silver Creek, Dewitt, Iowa.....                  | 250                    |
| San Marcos River, San Marcos, Tex.....            | 50,000                 | Frazer and Lefinwell lakes, Wheatland, Iowa..... | 250                    |
| Applicants in Texas.....                          | 4,655                  | Mississippi River, Bellevue, Iowa.....           | 100,000                |
| Connecticut River, Wells River, Vt.....           | 500                    | Applicants in Iowa.....                          | 200                    |
| Salem and Derby ponds, Newport, Vt.....           | 100                    | Lakeside Lake, Olathe, Kans.....                 | 200                    |
| Lake Dunmore, Norfolk, Va.....                    | 100                    | Eureka Lake, Manhattan, Kans.....                | 200                    |
| North Anna River, Mineral City, Va.....           | 200                    | McDowell Creek, Manhattan, Kans.....             | 100                    |
| Peak Creek, Pulaski City, Va.....                 | 100                    | Little Arkansas River, Wichita, Kans.....        | 200                    |
| Millpond, Burkeville, Va.....                     | 100                    | Prairie Dog Dam, Dresden, Kans.....              | 75                     |
| Mattaponi River, Guineas, Va.....                 | 200                    | Pelican Creek, Oberlin, Kans.....                | 75                     |
| Baker Millpond, Widewater, Va.....                | 100                    | Northwest Fork Kiowa Creek, Bucklin, Kans.....   | 100                    |
| King Pond, Ashland, Va.....                       | 100                    | Forest Lake, Bonner Springs, Kans.....           | 230                    |
| Great Run, Warrenton, Va.....                     | 100                    | Applicants in Kansas.....                        | 1,775                  |
| Mountain Lake, Mountain Lake, Va.....             | 200                    | Spring Lake, Paducah, Ky.....                    | 600                    |
| Falling River, Brookneal, Va.....                 | 150                    | Stoner Creek, Winchester, Ky.....                | 100                    |
| Canterbury Pond, Richmond, Va.....                | 100                    | Howard Lower Creek, Winchester, Ky.....          | 100                    |
| Difficult Creek Pond, Clover, Va.....             | 200                    | Water company's lake, Winchester, Ky.....        | 100                    |
| Cowpasture River, Millboro, Va.....               | 355                    | Clark County Poorhouse lake, Winchester, Ky..... | 100                    |
| Jackson River, Cedar Creek, Va.....               | 200                    | Lake Ellerslie, Lexington, Ky.....               | 100                    |
| Millpond, Raphine, Va.....                        | 100                    | Ritter Lake, Falmouth, Ky.....                   | 200                    |
| Black Pond, Vienna, Va.....                       | 240                    | Applicants in Kentucky.....                      | 2,300                  |
| Bluestone River, Pauls Mills, Va.....             | 100                    | Little Youghiogheny River, Oakland, Md.....      | 1,500                  |
| Millington Pond, Green Springs Depot, Va.....     | 100                    | Potomac River, Woodmont, Md.....                 | 200                    |
| Artificial Lake, Rapidan, Va.....                 | 100                    | Applicants in Maryland.....                      | 100                    |
| Ice Pond, Mount Holly, Va.....                    | 50                     | Sturgeon Lake, Sturgeon Lake, Minn.....          | 375                    |
| North River, East Lexington, Va.....              | 200                    | Cutoff Lake, Brunswick, Mo.....                  | 300                    |
| James River, Gilmore Mills, Va.....               | 100                    | Springwater Lake, Independence, Mo.....          | 100                    |
| Abert, Va.....                                    | 50                     | Crisp Lake, Independence, Mo.....                | 3,100                  |
| Hollywood Cemetery Lake, Richmond, Va.....        | 150                    | Lake McDonald, Independence, Mo.....             | 1,270                  |
| Silver Spring Lake, Gordonsville, Va.....         | 100                    | Hickory Creek, Neosho, Mo.....                   | 320                    |
| Applicants in Virginia.....                       | 1,350                  | Park Lake, Clinton, Mo.....                      | 100                    |
| Decker Creek, Morgantown, W. Va.....              | 275                    | Applicants in Missouri.....                      | 300                    |
| Buffalo Creek, Fairmont, W. Va.....               | 275                    | McPherson Pond, Fayetteville, N. C.....          | 20                     |
| Bethany, W. Va.....                               | 200                    | Johnston Mill Pond, Littleton, N. C.....         | 20                     |
| Tygarts Valley River, Foxhall, W. Va.....         | 400                    | Little Alamance River, Burlington, N. C.....     | 100                    |
| Elkins, W. Va.....                                | 600                    | Lake Rhett, Flatrock, N. C.....                  | 50                     |
| Elk Creek, Clarksburg, W. Va.....                 | 275                    | Toe River, Marion, N. C.....                     | 200                    |
| West Fork River, Clarksburg, W. Va.....           | 275                    | Applicants in North Carolina.....                | 410                    |
| Lake Terra Alta, Terra Alta, W. Va.....           | 275                    | Devils Lake, Devils Lake, N. Dak.....            | 150                    |
| Snowy Creek and Lake, Terra Alta, W. Va.....      | 275                    | Weiremiller Lake, Church Ferry, N. Dak.....      | 50                     |
| Shenandoah River, Charlestown, W. Va.....         | 275                    | Lake Irvine, Church Ferry, N. Dak.....           | 25                     |
| Back Creek, Martinsburg, W. Va.....               | 200                    | Lewis Pond, Church Ferry, N. Dak.....            | 75                     |
| Opequan Creek, Martinsburg, W. Va.....            | 400                    | Whitewater River, Harrison, Ohio.....            | 200                    |
| Potomac River, Martinsburg, W. Va.....            | 275                    | Glendale Lake, Glendale, Ohio.....               | 200                    |
| Elk River, Charleston, W. Va.....                 | 1,750                  | Burger Fish Pond Lake, Pondercreek, Okla.....    | 100                    |
| South Branch Potomac River, Romney, W. Va.....    | 275                    | Spring Lake, Enid, Okla.....                     | 100                    |
| Little Kanawha and Elk rivers, Sutton, W. Va..... | 700                    | Applicants in Oklahoma.....                      | 200                    |
| Applicants in West Virginia.....                  | 250                    | Mud Run, Penllyn, Pa.....                        | 100                    |
| Wanby Lake, Lakewood, Wis.....                    | 600                    | Lake Melinlie, Ebensburg, Pa.....                | 300                    |
| Elbow and Newton lakes, Wausaukee, Wis.....       | 600                    | Conococheague Creek, Marion, Pa.....             | 500                    |
| Bearskull Lake, Lac du Flambeau, Wis.....         | 600                    | Lake Hopatcong, Bethlehem, Pa.....               | 200                    |
| Elk Lake, Phillips, Wis.....                      | 2,300                  | Juniata River, Huntingdon, Pa.....               | 400                    |
| Butternut Lake, Butternut, Wis.....               | 2,300                  |  |                        |
| Applicants in Wisconsin.....                      | 100                    |  |                        |
| Total.....  | 282,127                |  |                        |

| Species and disposition.                           | Adults<br>and<br>year-<br>lings. | Species and disposition.                                 | Adults<br>and<br>year-<br>lings. |
|--|----------------------------------|--|----------------------------------|
| <i>Crappie</i> —Continued.                         |                                  | <i>Rock bass</i> —Continued.                             |                                  |
| Ingleside Fish Lake, Summerville,<br>S. C.....     | 50                               | Howard Lower Creek, Winchester,<br>Ky.....               | 100                              |
| Clifton Millpond, Clifton, S. C.....               | 50                               | Stoner Creek, Winchester, Ky.....                        | 100                              |
| Sycamore, S. C.....                                | 50                               | Strode Creek, Winchester, Ky.....                        | 100                              |
| Saluda River, Pelzer, S. C.....                    | 100                              | Water Company's Lake, Winches-<br>ter, Ky.....           | 100                              |
| Fair Forest Creek, Spartanburg, S. C.....          | 50                               | Spring Lake, Winchester, Ky.....                         | 300                              |
| Broad River, Blacksburg, S. C.....                 | 130                              | Lake Ellerslie, Lexington, Ky.....                       | 200                              |
| Applicants in South Carolina.....                  | 275                              | Applicants in Kentucky.....                              | 600                              |
| Sylvan Lake, Custer, S. Dak.....                   | 30                               | Moose Lake, Hancock, Minn.....                           | 300                              |
| Buffalo River, Perryville, Tenn.....               | 800                              | Spring Creek, Marionville, Mo.....                       | 200                              |
| South Fork Holston River, Bluff<br>City, Tenn..... | 125                              | Hickory Creek, Neosho, Mo.....                           | 500                              |
| Watauga River, Watauga, Tenn.....                  | 125                              | Rogers Lake, Frederickstown, Ohio.....                   | 300                              |
| French Broad River, Leadvale, Tenn.....            | 228                              | Odell Lake, Lakeville, Ohio.....                         | 300                              |
| Alamosa Lake, Wichita Falls, Tex.....              | 50                               | Dohner Lake, Doylestown, Ohio.....                       | 300                              |
| Spring Lake, Wichita Falls, Tex.....               | 50                               | Applicants in Ohio.....                                  | 800                              |
| Millpond, Amarillo, Tex.....                       | 75                               | Sportsman Creek, Bridgeport, Okla.....                   | 200                              |
| Spring Lake, Brownwood, Tex.....                   | 50                               | Gageby Creek, Amarillo, Tex.....                         | 100                              |
| Barton Creek, Clarendon, Tex.....                  | 200                              | Gabe Creek, Amarillo, Tex.....                           | 100                              |
| Myers Pond, San Angelo, Tex.....                   | 125                              | Amarillo Creek, Amarillo, Tex.....                       | 425                              |
| South Concho River, San Angelo,<br>Tex.....        | 25                               | Chicken River, Amarillo, Tex.....                        | 800                              |
| Flag Springs Lake, Taylor, Tex.....                | 25                               | Buffalo Springs Creek, Tascosa, Tex.....                 | 50                               |
| Lake Olmos, Taylor, Tex.....                       | 30                               | Barton Creek, Clarendon, Tex.....                        | 200                              |
| Burns Lake, Taylor, Tex.....                       | 20                               | Spring Lake, Tyler, Tex.....                             | 400                              |
| Turner Lake, Taylor, Tex.....                      | 25                               | Lake View, Brownwood, Tex.....                           | 100                              |
| Moore Lake, Taylor, Tex.....                       | 20                               | Sabine River, Greenville, Tex.....                       | 300                              |
| Reservoir, Brownwood, Tex.....                     | 30                               | Willow Lake, Pittsburg, Tex.....                         | 100                              |
| Fairland Lake, Brownwood, Tex.....                 | 60                               | Long Branch, Kingsbury, Tex.....                         | 50                               |
| Lake Thorne, Longview, Tex.....                    | 150                              | Artificial Lake, Austin, Tex.....                        | 50                               |
| Hill Lake, Longview, Tex.....                      | 150                              | Aughtaugh Lake, Richmond, Tex.....                       | 100                              |
| Lovelace Lake, Hillsboro, Tex.....                 | 50                               | Dry Creek, Richmond, Tex.....                            | 100                              |
| Lake Gibbons, Paris, Tex.....                      | 100                              | Fairchild Creek, Richmond, Tex.....                      | 50                               |
| Oak Lake, Waco, Tex.....                           | 50                               | Gibbons Lake, Paris, Tex.....                            | 75                               |
| Beld Springs Lake, West, Tex.....                  | 30                               | Cottonwood Creek Lake, Goodwin,<br>Tex.....              | 50                               |
| Quion Creek, Manchaca, Tex.....                    | 50                               | Applicants in Texas.....                                 | 2,590                            |
| Crystal Lake, Pittsburg, Tex.....                  | 40                               | Spring Branch, Mosleys Junction, Va.....                 | 100                              |
| Artificial Lake, Austin, Tex.....                  | 25                               | Lake Raymond, Petersburg, Va.....                        | 300                              |
| Walnut Stream, Austin, Tex.....                    | 50                               | Millpond, Roxbury, Va.....                               | 300                              |
| Running Stream, Llano, Tex.....                    | 100                              | Little River and Goose Creek, Plains<br>Station, Va..... | 600                              |
| Marcado Creek, Victoria, Tex.....                  | 30                               | Glen Allen Lake, Glen Allen, Va.....                     | 100                              |
| Reservoir, Victoria, Tex.....                      | 20                               | Applicants in Virginia.....                              | 2,800                            |
| Spring Creek, Victoria, Tex.....                   | 25                               | Total.....   | 18,164                           |
| Quitague Creek, Canyon City, Tex.....              | 30                               |  |                                  |
| Guadalupe River, Kerrville, Tex.....               | 245                              | <i>Strawberry bass:</i>                                  |                                  |
| Cuero, Tex.....                                    | 50                               | Liveoak Creek, Jerome, Ariz.....                         | 100                              |
| Millpond, Kerrville, Tex.....                      | 25                               | Flagstaff, Ariz.....                                     | 100                              |
| San Pedro Springs, San Antonio,<br>Tex.....        | 75                               | Big Lake, Biglake, Ark.....                              | 200                              |
| Applicants in Texas.....                           | 1,065                            | Cypress Brake Lake, Bastrop, La.....                     | 100                              |
| Jackson River, Cedar Creek, Va.....                | 720                              | Chaplin Lake, Natchitoches, La.....                      | 100                              |
| Cowpasture River, Millboro, Va.....                | 360                              | Applicants in Louisiana.....                             | 70                               |
| James River, Gilmore Mills, Va.....                | 120                              | Gasconade River, Arlington, Mo.....                      | 4,000                            |
| Abert, Va.....                                     | 60                               | Hickory Creek, Neosho, Mo.....                           | 574                              |
| Applicants in Virginia.....                        | 240                              | Applicants in Missouri.....                              | 300                              |
| Decker Creek, Morgantown, W. Va.....               | 100                              | Colony Fork Lake, Ranger, Tex.....                       | 2,000                            |
| Tygart Valley River, Foxhall, W. Va.....           | 300                              | Total.....   | 7,544                            |
| Elk Creek, Clarksburg, W. Va.....                  | 100                              |  |                                  |
| Lake Terra Alta, Terra Alta, W. Va.....            | 150                              | <i>Warmouth bass:</i>                                    |                                  |
| Snowy Creek and Lake, Terra Alta,<br>W. Va.....    | 150                              | Maquoketa River, Manchester, Iowa.....                   | 1,600                            |
| Back Creek, Martinsburg, W. Va.....                | 300                              | Lake McDonald, Independence, Mo.....                     | 250                              |
| Opequan Creek, Martinsburg, W.<br>Va.....          | 300                              | Total.....   | 1,850                            |
| Potomac River, Martinsburg, W. Va.....             | 400                              |  |                                  |
| Elk River, Charleston, W. Va.....                  | 500                              | <i>Sun-fish:</i>   |                                  |
| Buffalo Creek, Bethany, W. Va.....                 | 600                              | Lake McDonald, Independence, Mo.....                     | 2,100                            |
| Applicants in West Virginia.....                   | 600                              |  |                                  |
| Total.....   | 151,653                          | <i>Bream:</i>  |                                  |
| <i>Rock bass:</i>                                  |                                  | Millpond, Pittsboro, Ala.....                            | 200                              |
| Oxford Lake, Oxford, Ala.....                      | 200                              | Clamdale Lake, Washington, Ga.....                       | 100                              |
| Spring Branch, Birmingham, Ala.....                | 58                               | Spring Branch, Utopia, Ga.....                           | 100                              |
| Applicants in Alabama.....                         | 716                              | East Lake, Atlanta, Ga.....                              | 200                              |
| Liveoak Creek, Flagstaff, Ariz.....                | 200                              | McCall Lake, Macon, Ga.....                              | 200                              |
| Applicants in Arizona.....                         | 300                              | Applicants in Georgia.....                               | 200                              |
| Applicants in Arkansas.....                        | 900                              | Mississippi River, Bellevue, Iowa.....                   | 50,000                           |
| Horseshoe Lake, Wynwood, Ind. T.....               | 100                              | Crystal Lake, Palestine, Tex.....                        | 300                              |
| Applicants in Indian Territory.....                | 200                              | Total.....   | 51,300                           |
| Applicants in Kansas.....                          | 1,250                            |  |                                  |

*Details of distribution—Continued.*

| Species and disposition.           | Fry.        | Species and disposition.         | Fry.        |
|------------------------------------|-------------|----------------------------------|-------------|
| <i>Cod:</i>                        |             | <i>Lobster—Continued.</i>        |             |
| Tangier Sound, Crisfield, Md. .... | 3,000,000   | Atlantic Ocean—Continued.        |             |
| Vineyard Sound:                    |             | Scituate, Mass. ....             | 1,933,000   |
| Near Tarpaulin Cove Light,         |             | Cohasset, Mass. ....             | 2,530,000   |
| Mass. ....                         | 37,593,000  | Lanesville, Mass. ....           | 1,800,000   |
| Robinson Hole, Mass. ....          | 11,807,000  | Beverly, Mass. ....              | 3,950,000   |
| Off Jobs Neck, Mass. ....          | 24,625,000  | Woods Hole Harbor, off Grass     |             |
| Quicks Hole, Mass. ....            | 11,064,000  | Ledge Island, Mass. ....         | 1,150,000   |
| Gay Head Light, Mass. ....         | 5,046,000   | Eel Pond, Waquoit, Mass. ....    | 1,258,000   |
| Nobska Light, Mass. ....           | 17,095,000  | Katama Bay, off Edgartown,       |             |
| Can Buoy, Mass. ....               | 6,327,000   | Mass. ....                       | 1,274,000   |
| Bow Bells, Mass. ....              | 419,000     | Wellfleet Harbor, off Mayo       |             |
| Atlantic Ocean:                    |             | Beach, Mass. ....                | 875,000     |
| Off Gay Head, Mass. ....           | 3,047,000   | Casco Bay, off—                  |             |
| Gloucester, Mass. ....             | 97,392,000  | Diamond Island, Me. ....         | 1,200,000   |
| Rockport, Mass. ....               | 26,500,000  | Long Island, Me. ....            | 1,500,000   |
| Ipswich Bay, Rockport, Mass. ....  | 11,511,000  | Cow Island, Me. ....             | 1,500,000   |
| Eel Pond, Woods Hole, Mass. ....   | 4,935,000   | Small Point, Me. ....            | 500,000     |
| Woods Hole Harbor, Woods Hole,     |             | Penobscot Bay, off Isle au Haut, |             |
| Mass. ....                         | 4,963,000   | Me. ....                         | 500,000     |
| Total .....                        | 265,324,000 | Gulf of Maine, off—              |             |
| <i>Flat-fish:</i>                  |             | Boothbay Bay, Me. ....           | 1,500,000   |
| Woods Hole Harbor, Woods Hole,     |             | Port Clyde, Me. ....             | 500,000     |
| Mass. ....                         | 66,317,000  | Cape Meddick, Me. ....           | 1,000,000   |
| Eel Pond, Woods Hole, Mass. ....   | 548,000     | Kennebunkport, Me. ....          | 1,000,000   |
| Waquoit Bay, Waquoit, Mass. ....   | 17,590,000  | Cape Porpoise, Me. ....          | 2,000,000   |
| Buzzards Bay, off Weepecket        |             | Wood Island, Me. ....            | 1,000,000   |
| Island, Mass. ....                 | 2,660,000   | Richmond Island, Me. ....        | 1,000,000   |
| Total .....                        | 87,115,000  | Matinicus Island, Me. ....       | 500,000     |
| <i>Lobster:</i>                    |             | Gulf of Maine, near Halfway      |             |
| Fisher Island Sound, off—          |             | Rock, Me. ....                   | 3,000,000   |
| Fisher Island, Conn. ....          | 745,000     | Indian Harbor, Indian Harbor,    |             |
| Noank, Conn. ....                  | 1,123,000   | Me. ....                         | 200,000     |
| Seal Harbor, between Whitehead     |             | Moose River (mouth of), Som-     |             |
| and Sprucehead, Me. ....           | 500,000     | erset County, Me. ....           | 300,000     |
| Owls Head Bay, near western        |             | Harpswell Harbor, Harpswell      |             |
| shore of Owls Head, Me. ....       | 500,000     | Harbor, Me. ....                 | 2,500,000   |
| Rockland Harbor (southwestern      |             | Orr Island Harbor, Orr Isl-      |             |
| side), Rockland, Me. ....          | 1,000,000   | and, Me. ....                    | 1,000,000   |
| Atlantic Ocean:                    |             | Hadley Harbor, Gosnold, Mass     | 8,686,000   |
| Kittery Point, Me. ....            | 1,500,000   | Vineyard Sound:                  |             |
| York Harbor, Me. ....              | 4,750,000   | Off Cedartree Neck, Mass. ....   | 589,000     |
| Portsmouth Harbor, Me. ....        | 1,625,000   | Menemsha Bight, Mass. ....       | 243,000     |
| Newcastle, N. H. ....              | 1,625,000   | Cuttyhunk Channel, Cutty-        |             |
| Gloucester, Mass. ....             | 15,720,000  | hunk, Mass. ....                 | 467,000     |
| Rockport, Mass. ....               | 2,270,000   | Buzzards Bay, off Penikese Isl-  |             |
|                                    |             | and, Mass. ....                  | 353,000     |
|                                    |             | Total .....                      | *77,166,000 |

\* In addition to the above, 3,767,000 lobster fry were produced, which were delivered to Dr. H. C. Bumpus for scientific purposes.

# REPORT ON THE INQUIRY RESPECTING FOOD-FISHES AND THE FISHING-GROUNDS.

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BY HUGH M. SMITH, *Assistant in Charge.*

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## OYSTER INVESTIGATIONS.

### LYNNHAVEN RIVER, VIRGINIA.

During this year the oyster-fattening experiments at Lynnhaven River, Virginia, have been continued with encouraging results. The special objects have been to secure by artificial means a more abundant growth of the minute plants on which the oyster feeds in order that the oysters may more readily and surely attain a marketable condition. The use of commercial fertilizer as a pabulum for the diatoms was continued with increasing success. The *claire*, wholly shut off from the influence of the tides, was refilled in August with water having a density of 1.012, and a good quality of fertilizer was applied at the rate of 400 pounds to the acre, the *claire* having a mean depth of  $2\frac{1}{2}$  feet. The oysters, introduced at intervals between October and January, ultimately became as fat as any market requires, and some sent to Washington in March were exceptionally fat. It was found, however, that the time required for oysters to attain the desired condition was too long for practical purposes, probably because the processes of respiration, feeding, etc., are not sufficiently active on account of the absence of tidal motion. The next step in the experiments will be the artificial production of currents throughout the *claire*, so that the water will be aerated and the vital processes in the oysters stimulated at the same time that the food organisms are being regularly supplied.

### NORTH CAROLINA.

In pursuance of the general policy of the Commission to assist the States in the development of their fishery resources, the steamer *Fish Hawk* was detailed for a thorough survey of certain oyster-grounds of North Carolina, the special object in view being the devising of methods for promoting the oyster industry and the determination of the factors which underlie the failure of oyster-culture in the State during the past ten or twelve years. A consideration of these points involved a complete study of the biological and physical characters of the oyster-grounds. The extent of the North Carolina waters adapted to the existence of oysters prevented an examination of more than a small part of the grounds in one season, and the work was therefore restricted to certain areas of special interest.



In September, 1899, the investigations were begun in the vicinity of Beaufort and Morehead, and included Newport and North rivers, the Straits, Jarrett Bay, and Back Sound, which waters were completed in December; then the *Fish Hawk* moved into Pamlico Sound, where it was engaged until March, 1900, in work on several important areas, including Swan Quarter Bay, the most productive oyster section in the State.

The general examination of the oyster-beds was under the immediate charge of Mr. James A. Smith, the commanding officer of the vessel, who was assisted by Mr. W. F. Hill and Mr. O. F. Bellows, who were detailed from the office at Washington as surveyors and draftsmen, and by Dr. Caswell Grave, of Johns Hopkins University, who gave particular attention to the biological features of the inquiry. Prof. J. A. Holmes, director of the North Carolina geological and natural-history survey, took great interest in the work and his suggestions as to the especial regions to be examined were followed. The State Oyster Commission, at the request of Professor Holmes, detailed their steam launch to assist in the survey in Pamlico Sound. Special reports on the work have been submitted by the commander of the vessel and Dr. Grave, and large detailed charts delineating the natural and planted oyster-beds have been prepared in the office by Mr. Hill from data obtained in the field.

#### EASTERN OYSTERS ON THE PACIFIC COAST.

Although the eastern oyster has been acclimatized in the Pacific States for a number of years, it is only in California that natural reproduction is known to have taken place. If the oysters in Oregon and Washington have reproduced, the young have not survived the free-swimming stage. This matter is naturally engaging the attention of the State fishery authorities. References to the studies of the eastern oysters planted in Yaquina Bay, Oregon, have been made in previous reports of the division. In 1899 the condition of the oysters in Willapa Bay, Washington, received attention. The Commission had planted 80 barrels of eastern oysters in this place in 1894, with the understanding that they would be properly guarded and left to multiply. The absence of recent reports from this lot, together with requests from the State that the physical conditions in the bay be considered with reference to oyster propagation, led the Commission to undertake a preliminary examination in the present fiscal year. Dr. H. F. Moore, naturalist on the *Albatross* and an oyster expert, having been detailed to visit the bay in August, 1899, while en route to join the vessel, made the following report:

Pursuant to orders, I have visited Willapa Bay for the purpose of examining the eastern oysters planted there by the Commission and "to determine whether natural spawning has taken place, and if not, whether there are physical conditions which prevent it." I have found that the oysters planted there by the Commission have been almost exterminated, a somewhat lengthy search resulting in finding



but five. The reasons for this are not to be defined from the brief examination which it was possible for me to make. They may have become buried by shifting of the bottom or by the deposit of silt, but from the condition of the shells found I am inclined to think that neither explanation is adequate, and I suspect that some, at least, of the transplanted oysters have found their way to market. I understand that these oysters were bedded rather thickly, and if they and the dead shells have not become buried they have certainly been carried off through some agency. I have learned from the oystermen that at the end of the first year a large proportion of those planted had survived and were on the beds, but after that they became gradually fewer. It would appear, therefore, that they had withstood the vicissitudes of transportation with a fair degree of success.

During the last two or three years several private beds of eastern oysters have been established in different parts of Willapa Bay and they are reported to be doing well, possibly because it is somebody's interest to protect them from depredations of unprincipled persons.

In this connection I should counsel against further plantings of oysters on this coast by the Commission unless satisfactory guarantee can be offered that they will be protected from theft. A general assurance from the oystermen of a given locality is not sufficient, as then no one feels the responsibility and no one wishes to assume the onus of prosecuting the offenders even if they be detected.

In two of the five oysters found the ovaries were well developed and apparently ripe eggs could be squeezed from the oviduct. The other three were not sexually mature, and as no males were found the possibility of fertilizing the eggs could not be tested. I understand, however, that Professor Doan, of the State Agricultural College, succeeded in fertilizing some eggs earlier in the summer. He is said to be carrying on experiments on the line of artificial fecundation as a solution of the difficulties in establishing self-sustaining beds.

So far as I could learn, there is no evidence that the eastern oyster has ever naturally spawned here, or, rather, that there has ever been a set of spat. I think that the cold water here will prevent that under ordinary conditions, but I believe that in shallow ponds suitably constructed, and with proper precautions against the deposit of silt on the cultch, spat may be raised for subsequent planting in the open bay. If the Commission is to attempt oyster-culture on this coast, it seems to me that this line of research is the one indicated as most reasonable and most likely to yield results of value. The water during my stay was about 61° F., 8 or 9 degrees lower than usually suffices for the development of oyster fry.

We have no series of temperature and density observations extending throughout the year on this coast, and I have left a set of salinometers with Mr. Bush, who will make and record observations.

Concerning the native oyster, I made the interesting observation that, like its European relative, the eggs undergo a very considerable development in the gill chamber of the mother. When discharged they are, in fact, about at the stage of fixation. The eggs and embryos are very much larger than the eggs of the eastern oyster. I do not remember to have seen this fact mentioned by those who have called attention to the hermaphroditism of the species.

The failure of the eastern oyster to reproduce in the colder waters of Oregon and Washington has suggested the desirability of transplanting to our west coast some of the fine large oysters found in northern Japan, notably in Akishi Bay, on the eastern side of Hokushu Island. This step has been recommended by the Commission to some of the oyster-planters of Washington, and it is understood that negotiations are now under way for the shipment of a cargo for transplanting in Willapa Bay and other waters of Washington.

## WORK AT THE BIOLOGICAL LABORATORIES.

## WOODS HOLE, MASSACHUSETTS.

From the report of Dr. H. C. Bumpus, the director of the biological laboratory of the Commission at this place, the following outline of the work there carried on has been taken:

The year has been characterized by general improvements in the equipment of the laboratory, increased facilities for collecting material, enlarged library accommodations, and a gratifying increase in the amount of scientific work accomplished. The Commissioner was at the station during the greater portion of the summer, and through his advice many needed changes were made in and about the laboratory.

The steamer *Fish Hawk* was at the station at the beginning of the fiscal year and remained until September 6. During the summer the trawl was lowered 71 times, and Mr. J. D. Milligan kept a careful record of all the animals taken. The efficiency of the *Fish Hawk* as an instrument of biological research was largely due to the skill, interest, and experience of the commanding officer, James A. Smith, mate, U. S. Navy.

The *Grampus* made three trips to the Gulf Stream, and Captain Hahn secured valuable data respecting the distribution of the tile-fish. The steam launches *Blue Wing*, *Cygnets*, and *Merganser* were in daily use during July and August.

At the close of the summer of 1899 Commissioner Bowers recommended that a large room, heretofore used as a museum, be repaired and made into a library. Nothing during the year has occasioned more general approval from men of science than the furnishing of this room for the growing library and as a resort for those who wish to study. The card catalogue shows a gratifying increase in the number of contributions to the library, and already the list of acquisitions numbers over 3,000 volumes and pamphlets. The librarian of Brown University has kindly loaned sets of the more important scientific journals, and the authorities of the Marine Biological Laboratory have extended the use of their library to those working at the Commission.

The number of those who pursued investigations at the laboratory is somewhat larger than in the previous year, and while it includes many who worked on problems solely of economic importance, the director did not hesitate to call upon any or all for advice or assistance when the interests of the Commission could be thereby subserved. Indeed, the following list represents a body of able and willing volunteers: Warren E. Babcock, M. D., Ogdensburg, N. Y.; Barton A. Bean, U. S. National Museum; James E. Benedict, Ph. D., U. S. National Museum; R. P. Bigelow, Ph. D., Massachusetts Institute of Technology; Maurice A. Bigelow, M. S., Harvard University; R. E. Blount, A. B., Chicago, Ill.; H. C. Bumpus, Ph. D., Brown University; R. S. Breed, M. S., Harvard University; T. J. Burrage, A. B., Brown University; H. L. Clark, Ph. D., Amherst College; H. A.

Childs, B. S., University of Iowa; F. P. Drowne, Brown University; W. H. Dudley, Wisconsin State Normal School; G. W. Field, Ph. D., Rhode Island Agricultural College; W. W. Francis, Johns Hopkins University; Peter Frandsen, A. B., Harvard University; Erik H. Green, A. M., Massachusetts Institute of Technology; C. W. Hargitt, Ph. D., Syracuse University; Harold Heath, Ph. D., Leland Stanford University; C. J. Herrick, M. S., Denison University; S. J. Holmes, Ph. D., University of Michigan; Freeland Howe, jr., A. B., Harvard University; J. M. Johnson, Harvard University; R. H. Johnson, Harvard University; J. L. Kellogg, Ph. D., Olivet College; C. R. Knight, American Museum of Natural History; T. G. Lee, M. D., University of Minnesota; A. B. Lewis, A. M., University of Nebraska; Edwin Linton, Ph. D., Washington and Jefferson College; C. G. Maywood, A. B., Albion College; A. D. Mead, Ph. D., Brown University; P. Calvin Mensch, M. D., Ursinus College; E. C. McKibben, Denison University; W. J. Moenkhaus, Ph. D., Harvard University; C. C. Nutting, A. M., University of Iowa; G. H. Parker, D. S., Harvard University; H. F. Perkins, A. B., Johns Hopkins University; Charles W. Prentiss, A. M., Harvard University; Herbert W. Rand, A. M., Harvard University; Jonathan Risser, Grinnell College; Porter E. Sargent, A. M., Harvard University; H. Sherwood, A. M., Brown University; Arthur J. Stewartson, Washington and Jefferson College; Myron W. Stickney, A. M., Worcester Academy; R. M. Strong, A. B., Harvard University; Oliver S. Strong, Ph. D., Columbia University; C. F. Sylvester, Princeton College; G. W. Sylvester, Princeton College; Millett T. Thompson, A. M., Brown University; Edward L. Thorndike, Ph. D., Columbia University; R. W. Tower, A. M., Brown University; E. E. Tyzzer, A. M., Harvard Medical School; Ira Van Gieson, M. D., Pathological Institute of the New York State Hospitals; H. E. Walter, A. M., North Division High School, Chicago; L. B. Walton, A. M., Brown University; F. E. Watson, A. M., Brown University; W. A. Willard, A. M., Harvard University; W. M. Wheeler, Ph. D., University of Texas; S. R. Williams, A. M., Harvard University; G. M. Winslow, Ph. D., Auburndale, Mass.; R. M. Yerkes, A. B., Harvard University.

Dr. James L. Kellogg, assisted by Mr. George H. Sherwood, has conducted a series of experiments to test the rate of growth of the clam and the feasibility of clam cultivation. The results of these experiments will be published in a special report.

Mr. George H. Sherwood has carried on a series of observations for the purpose of determining the cause of the migrations of fish. Mr. Vinal N. Edwards's valuable records of the times of arrival and departure of various species of fish visiting the Woods Hole region have proved of great service in this work.

In 1898 Professor McClure, assisted by Mr. C. F. Sylvester, began a comparative study of the circulatory system of fishes, which has been continued during the present year. The nets and traps of the Commission have provided him with material for this work.

Mr. E. H. Green has made a chemical examination of the connective tissue of the ocean sun-fish to determine its value as a glue-producing material; and has begun an analysis of the chitin of the lobster for the purpose of finding for it some commercial use.

Mr. E. E. Tyzzer, of Harvard Medical School, and Dr. Cushing, of Jefferson Medical College, have begun investigations on the diseases of fishes, in which they have had the assistance of Dr. Edwin Linton, who for many years has confined his studies to the entozoa of fishes.

During July and August, 1899, Dr. J. E. Benedict was given opportunity to collect material for the U. S. National Museum, and in August and September Mr. Barton A. Bean collected fishes for the same institution. In August Mr. Freeland Howe, jr., accompanied the *Fish Hawk* on a dredging excursion to the Gulf Stream. His account of the biological results will appear in an early paper of the Bulletin.

For many years workers at Woods Hole have needed papers of general reference in which they might find descriptions of the numerous animals which occur in this region. The publications of Professor Verrill on the invertebrates of Vineyard Sound have been for a long time out of print, and it has been decided to issue a series of faunistic papers which will ultimately embrace all of the invertebrate groups. The copepods and hydroids, two groups of invertebrates contributing largely to the general food supply of fishes, have been given special attention during the past year. Prof. W. M. Wheeler, of the University of Texas, has already prepared a paper on the former group, which will appear in the Bulletin for 1899, and Prof. C. C. Nutting, of the University of Iowa, has a paper on the latter group, which will be ready for the printer at an early date.

Prof. Hubert L. Clark, of Olivet College, Michigan, has in preparation a paper on the general anatomy of the star-fish, and Thomas J. Burrage, of the Harvard Medical School, has contributed an anatomical paper on the alimentary tract of the flounder.

Excellent photographs of living fish have been taken by Mr. M. W. Stickney, and sketches of living marine animals have been made by Mr. Charles R. Knight, of the American Museum.

Much interest has been manifested in recent years in the photography of living fishes and other animals in the water. While considerable difficulties are encountered, they are more than counterbalanced by the satisfaction in securing illustrations that actually represent the form and attitude of the live animals. In the United States great success in this line has been attained by Dr. R. W. Shufeldt, to whom the Commission extended facilities at the aquaria in Washington, and whose paper entitled "Experiments in Photography of Living Fishes" was printed in 1899 as a part of the Bulletin for that year. The plates in this paper, and also the text, have been extensively reprinted, both here and abroad. Working along independent lines, Mr. M. W. Stickney has achieved some creditable results in the photography of marine fishes at the Woods Hole laboratory.

## BEAUFORT, NORTH CAROLINA.

The opening of a laboratory at Beaufort, N. C., on June 1, 1899, was noticed in the last report, which contained an outline of the operations during the last month of the fiscal year. The laboratory remained open until September 15, and was occupied by Prof. W. K. Brooks, Dr. Caswell Grave, and Mr. A. M. Reese, all of Johns Hopkins University; Prof. E. W. Berger, of Baldwin University; Prof. J. I. Hamaker, of Trinity College (N. C.); Prof. T. G. Pearson, of Guilford College; Prof. J. Y. Graham, of the University of Alabama; and Mr. C. A. Shore, of the University of North Carolina, in addition to Prof. H. V. Wilson, of the same institution, who was in charge. The laboratory reopened under the same direction on June 1, 1900, during which month tables were taken by Prof. E. B. Wilson, Dr. H. E. Crampton, Mr. H. B. Torrey, and Mr. J. C. Torrey, of Columbia University; Dr. Grave; Professor Hamaker; Prof. R. E. Coker, of the Goldsboro (N. C.) public schools; and Mr. J. W. Turrentine, of the University of North Carolina.

Among the numerous special inquiries conducted by the laboratory corps, the following may be mentioned: Prof. H. V. Wilson, assisted by Mr. Shore, gave attention to the breeding conditions of certain fishes, sponges, and crustacean parasites, among the last being a small barnacle (*Dichelaspis*) on the gills of the common edible crab (*Callinectes*). Professor Coker and Mr. Turrentine, under Professor Wilson's supervision, investigated the spawning habits of various fishes, including the following edible forms, from all of which eggs were artificially taken and fertilized: Weak-fish (*Cynoscion regale*), spotted squeteague (*Cynoscion maculatum*), hog-fish (*Orthopristis*), porgy (*Chætodipterus*), and king-fish (*Menticirrhus*). The eggs of the silverside (*Menidia notata*), important as an article of food for the other fish, were also obtained, and some interesting and valuable observations on another small species, a blenny (*Hypleurochilus*), were made. The character of the food of the hog-fish and croaker (*Microponon*) was studied. The former species is regarded by many persons as having a distinctly unpleasant flavor and hence much less valuable as food than the same fish taken in the vicinity of Norfolk; one cause for the inferiority in flavor has been found to be a large species of the peculiar worm-like animal (*Balanoglossus*), which is very abundant on the flats in Beaufort Harbor and is freely eaten by the hog-fish. Dr. Grave studied the life-history of the brittle-stars (*Ophiurans*), and during the spring of 1900, while attached to the *Fish Hawk*, used the facilities of the station in connection with his examination of the oyster-grounds of the region. Dr. Crampton was occupied in investigating the effects of abnormal conditions on the development of the eggs of the oyster and other mollusks. Mr. Torrey considered the early development of one of the most abundant annelid worms (*Axiothea*), an important article of diet for some of the bottom-feeding fishes.

In the course of an extended article on "Marine Biology at Beau-



fort" in the *American Naturalist* for May, 1900, Professor Wilson, director of the laboratory, makes the following statements concerning the studies of the various animal forms of the region:

It is planned that the record of each species shall include mention of the localities in which it is fairly abundant, most convenient collecting methods, time of year during which breeding goes on, brief natural-history notes on habits of adult (food, enemies, parasites, rate of growth, time and extent of migration, etc.), and on the life-history (character of eggs, where and how deposited, possibility of artificial fertilization, period of embryonic development, character of larva and period of larval development, habitat, food, and enemies of larva). The economic value of such a knowledge of the natural history of the region will be readily understood, and it is equally obvious to what an extent it will aid naturalists engaged in the study of abstruse problems of morphological and physiological embryology, of comparative anatomy and physiology. Its value in connection with similar results of the work at other coast stations, to the study of the variability of organisms, may be here alluded to.

To carry out such a scheme of work for a rich fauna like that of Beaufort will require years. An excellent basis has, however, been built up, and profitable lines of study marked out by the members of the Johns Hopkins marine laboratory and by other naturalists. At the Fish Commission laboratory many of the previously known facts, some recorded, some unrecorded (in the possession of former workers at Beaufort), have been brought together and confirmed, and important additions have been made. The forms actually collected during the season of 1899 include 238 species of marine invertebrates, some 70 fishes, 50 birds, a number of reptiles, amphibia, insects, and arachnoids, and a very considerable number of land plants and algæ. In the case of a good number of species, notes along the lines indicated above were made. In another season's work doubtless all the recorded forms will have been taken and identified. Further progress can only be made by a formal division of labor among the members of the laboratory. With the great awakening of interest, which is so apparent to-day in the phenomena exhibited by animals and plants regarded as living units, it should not be difficult to find naturalists who will gladly work up the local natural history of the groups embracing the particular forms on which they may be investigating problems of a morphological or physiological character.

The variety of fishes that may be taken in a short time in Beaufort Harbor and adjoining waters is so great as to make it evident that the number recorded (Jenkins gives 134) for the region will be greatly increased when systematic collecting has been carried on for a few years. Some 9 miles from Beaufort inlet the coast line makes a sharp right-angled bend, with Cape Lookout at the angle. From the end of the cape a narrow line of shoals extends much farther out. The cape and its submerged continuation form a wall, as it were, reaching seaward for 15 miles. Cape Lookout itself is so shaped as to embrace a bay, a quiet and beautiful sheet of water, Lookout Bight. The coast configuration thus forms a remarkable natural trap into which fish migrating northward fall. It is doubtful whether a better place can be found anywhere on our coast for the carrying out of observations on oceanic species and on bay and river species during the oceanic period of their life. The seining at Cape Lookout has been extremely interesting and successful, both as regards the variety of forms and the number of individuals taken.

It is a source of great satisfaction to the Commission and to biologists that at the last session of Congress an act was passed providing for the establishment of a permanent station on the coast of North Carolina, at which the biological problems connected with the marine-fishery interests of the South Atlantic region may be investigated.



## MISCELLANEOUS MARINE AND FRESH-WATER INQUIRIES.

## SPECIAL LOBSTER AND CLAM INVESTIGATIONS.

In the urgent deficiency bill approved February 9, 1900, provision was made for special investigations having for their object the institution of measures for the arrest of the serious decline in the lobster and clam fisheries, which has been referred to in previous reports of the Commission. The intelligent consideration of the condition of these important fisheries and the steps needed to reverse the present downward tendency involve a comprehensive study of their history, methods, regulation, etc., but it has been apparent that the chief aid which can be rendered by the General Government lies in the direction of increased production through artificial means.

The hatching of lobsters on a large scale is a comparatively simple matter; but the rearing of the young to a point where they leave their defenseless free-swimming stage and assume the habits of the adult is a difficult problem which has heretofore not been successfully solved. With regard to the clams—more especially the soft-shell species (*Mya arenaria*)—it has seemed clear that the future of the industry depended largely on the inauguration of planting methods similar to those so successfully adopted with the oyster. This procedure presents few difficulties and gives promise of large returns in a short time, at a very small cost.

In April, 1900, the following special commission was created by the Commissioner for the prosecution of the investigations authorized by Congress: Dr. H. C. Bumpus, chairman; Mr. W. de C. Ravenel, Capt. E. E. Hahn, and Dr. H. M. Smith, secretary. It is chiefly to the biological and cultural problems involved in the development of practicable rearing methods that the commission will give attention. Already some important and significant results have been attained.

## MACKEREL.

The question of the existence of different races of mackerel (*Scomber scombrus*) on the east coast of North America was studied by Mr. M. C. Marsh in continuation of inquiries begun in the preceding year. For the purpose of securing ample material, Mr. Marsh in July and August visited several places in New England, and in Boston was able to examine large series of specimens from the Canadian provinces. Special facilities were extended by Mr. J. R. Neal and Messrs. Potter and Wrightington, of Boston, and Capt. A. W. Rich, of Provincetown. In May Hon. E. G. Blackford, of New York, forwarded 200 mackerel caught off New Jersey. About 2,000 specimens have now been examined, and their detailed study justifies the following conclusions:

(1) The existence of a marked racial distinction between American and British mackerel, as indicated by the studies of Mr. Walter Garstang, is strongly confirmed.

(2) The evidence thus far accumulated fails to disclose the existence on the American coasts of distinct bodies of mackerel, charac-

terized by color or structural features, such as are found on the shores of the British Isles. The examination of further material from extreme southern and northern localities is desirable, however, before the question can be considered settled.

Certain minor points in the relations of the characters have been determined. Thus a decrease in the number of dorsal spines with the growth of the fish, as shown by Garstang's material, holds good for American fish, as does a correlation between the dorso-lateral spots and the size of the fish, not exhibited by British mackerel. A preponderance of male fish, in the ratio of 2 to 1, is shown. No selective process, so far as known, would account for this disparity in the material examined.

#### COBBOSSEECONTEE AND SEBAGO LAKES, MAINE.

The study of the fish fauna of Sebago Lake by Dr. W. C. Kendall, referred to in the last report, was continued during July and part of August, 1899. Hon. L. T. Carleton, chairman of the State board of fish commissioners, having expressed a desire that the character of the fish life of Lake Cobbosseecontee be determined, Dr. Kendall devoted the last two weeks of August to this investigation.

Cobbosseecontee is the largest of a connected group of lakes in Kennebec County, the other important ones being Amabessacook and Maranacook. It is irregular in shape, about 9 miles long, 0.5 to 2.8 miles wide, and consists of two wide areas connected by a narrow portion. The shores are mostly rocky, with a few sandy beaches and a swamp at the southern end, through which several inlets pass. The lake discharges into Kennebec River through a small stream.

The fishes of the lake are not numerous as to species, but are as to individuals. Among the most abundant are the small-mouthed black bass (*Micropterus dolomieu*) and the white perch (*Morone americana*). The latter are protected by law and reach a large size, some weighing 3 pounds having been caught. Schools containing thousands of the season's young, from 3 to 6 inches long, were noticed along the sandy shores, where the black bass were feeding on them. Trout (*Salvelinus fontinalis*) are fairly common, reach a weight of 8 pounds, and afford good fishing in spring. Salmon (*Salmo sebago*) have been planted in the lake, but not with much success, as but few have been caught. The character of the lake water seems to be well suited to the salmon, whose apparent inability to maintain itself naturally may be due to restricted spawning-grounds and the abundance of predaceous fishes. An interesting ichthyological discovery is the existence in the lake of the brook stickleback (*Eucalia inconstans*), which has not heretofore been known from Maine waters. Other fishes found in the lake are the hornpout (*Ameiurus nebulosus*), sucker (*Catostomus commersonii*), chubs (*Semotilus corporalis* and *S. atromaculatus*), roach, locally called herring (*Abramis crysoleucas*), eel (*Anguilla chrysypa*), smelt (*Osmerus abboti*), pickerel (*Lucius reticulatus*), long-eared sunfish (*Lepomis*

*auritus*), common sun-fish (*Eupomotis gibbosus*), yellow perch (*Perca flavescens*), and five other minor species, which raise to twenty-one the list of forms known from the lake.

#### SENECA LAKE, NEW YORK.

This is one of the largest of the interior lakes of New York. No critical examination of its fish fauna appears to have been made, although it is extensively resorted to by anglers, has certain ichthyological features of special interest, and at one time or another has supported commercial fisheries of some importance. It also appears to be a field in which fish-cultural work may profitably be conducted. In August, 1899, a brief visit to the lake was made by Dr. H. M. Smith for the purpose of determining the nature and abundance of the fish life, and arrangements were made by which the fishes were collected throughout the year. When the extent of the fauna has been fully determined, a special report on the fishes of the lake will be issued. Meanwhile, a few notes on the principal species will here be given.

Seneca Lake is about 36 miles long and 1 to 4 miles wide, with a maximum depth of 500 to 600 feet. The lake, whose surface is about 450 feet above sea level, occupies an eroded valley flanked by bold hills. It is fed by small streams and discharges into Lake Ontario by means of Seneca River, Cayuga Lake, and Oswego River.

Various forms of commercial fishing are permitted in the lake, as shown by the following extract from the fishery law of New York:

It shall be lawful to fish in waters of Seneca Lake with nets or seines, the meshes of which shall not be less than a 2-inch bar, from the 15th day of April to the 15th day of August, both inclusive. It shall also be lawful to fish with spears in the waters of Seneca Lake for all fish except black bass from the 15th day of April to the 15th day of June, both inclusive.

The number of species of fishes known to inhabit Seneca Lake is small in comparison with the number recorded from the neighboring Cayuga Lake by Dr. Meek,\* although further inquiry will doubtless show the existence of a considerable number of other species. The occurrence in the lake of about 50 species has thus far been determined by the writer, of which about a third are food-fishes.

The alewife (*Pomolobus pseudoharengus*) is one of the most abundant fishes of the lake. The presence of this anadromous species has given rise to much speculation, such as has been indulged in with regard to the alewife in Lake Ontario and other New York lakes. It is generally believed that this species was introduced into Seneca Lake by Seth Green about 1872, but there is evidence to prove that as early as 1868 it had, probably unassisted, reached the lake. The chief interest now attached to the species is the annual mortality to

\* Notes on the Fishes of the Cayuga Lake Basin, Annals N. Y. Academy of Sciences, 1889.

which it is subject, as in Lake Ontario, large numbers dying each summer and causing much annoyance by decaying on the lake shores.

The lake trout (*Salvelinus namaycush*) is rather common, reaches a large size, and is caught with lines and spears. Several species of white-fish exist here. The common white-fish (*Coregonus clupeiformis*) was formerly numerous, but for about 15 years has been comparatively scarce. Another species, locally known as the "greenback," is rather abundant. A rare species is the "smelt" (*Argyrosomus osmeriformis*), known only from this lake and Skaneateles Lake.

The small-mouthed black bass (*Micropterus dolomieu*) is very abundant, as are also the rock bass (*Ambloplites rupestris*) and the sun-fish (*Eupomotis gibbosus*). The yellow perch (*Perca flavescens*) is numerous and reaches a large size, examples from deep water weighing 2 pounds. The wall-eyed pike was formerly abundant, but disappeared about the time the common white-fish became scarce, and is now practically absent. The remaining species include pickerel (*Lucius*), eel (*Anguilla chrysypa*), two or three suckers, about eight kinds of minnows, all of which are abundant, two species of cat-fish, and several darters. A very destructive species is the lamprey (*Petromyzon marinus unicolor*), which attacks cat-fish, pickerel, black bass, and other species, and kills many of them.

#### WEST VIRGINIA.

Investigations begun in West Virginia in 1899 had for their object the determination of the character of the fish life of the several large river basins draining into the Atlantic Ocean and into the Mississippi River. A party in charge of Mr. W. P. Hay entered the State in July and remained for a little more than two months, during which time numerous streams were examined in the basins of the Monongahela, Potomac, Greenbrier, and Elk rivers. Special attention was given to the Monongahela, of which about sixty tributaries were visited, chiefly by team, including the Cheat, Blackwater, Buckhannon, and other rivers. Large collections of the fishes of each stream were made, and extensive notes on the nature of the fish fauna were taken.

As a rule the streams of the Monongahela basin are swift, cool, with rocky beds and numerous falls, and naturally well adapted to sustain fish life. It appears that within comparatively recent years they have been able to sustain large numbers of the finest kinds of food-fishes, but at present the fishes are far from abundant and are becoming scarcer each year. The agencies which have cooperated to destroy the fishes are clearing of forests, reduction of food supply by changes in the character of the banks, pollution of the water in various ways, logging operations, dynamiting and damming to fit the streams for log "running," and several others, mostly incident to the industrial development of the country.

It is the purpose to continue the exploration of the streams of this State, giving special attention to those of the southwestern part tributary to the Ohio.

## LAKE ERIE.

The systematic study of the biological features of Lake Erie was resumed on July 1 and actively prosecuted for two months under the direction of Prof. Jacob Reighard, of the University of Michigan. Those assisting in the work were Prof. H. B. Ward, of the University of Nebraska; Dr. H. S. Jennings, of Dartmouth College; Dr. Julia Snow, of the University of Michigan; Mr. R. H. Pond, of the University of Michigan; Mrs. H. S. Jennings, Mr. J. H. McClellan, Dr. Charles Hill, and Mr. A. B. Lewis. The hatching station of the Commission at Put-in Bay was used as a laboratory as heretofore, and was the headquarters of the party. Those who pursued studies at Put-in Bay were Dr. Jennings, Dr. Snow, and Mr. Pond.

Dr. Jennings resumed the studies in which he was engaged in the previous year, namely, experimental investigations of the reactions of the protozoa of the lake to stimuli. The principles underlying the movements of these small organisms are probably applicable to the higher animals, including young fishes. Three papers of Dr. Jennings, based on this work, have appeared in the *American Journal of Physiology* for January and April, 1900, and the *American Naturalist* for the latter month.

Dr. Snow continued the investigations of the previous season, identifying numerous species of algæ and determining the life-histories of several, especially those occurring in the plankton. The nature of Dr. Snow's investigations are thus stated by Professor Reighard:

In order to have any permanent knowledge of the plankton algæ it is necessary that they be cultivated in the same manner as bacteria in culture media of different sorts. When so cultivated, it is found that algæ assume different forms. The different forms of the same algæ also occur in nature, and have been in many cases described as distinct species. We can not know what species are present in the lake until the life-history of each has been worked out so that we may know the various forms that it assumes.

Mr. Pond considered the question of the nutrition of the larger aquatic plants, conducting some work at the University of Michigan after the close of the Lake Erie work. The nature and importance of the subject studied by Mr. Pond are thus stated by the director:

It is the purpose of this investigation to find out whether the rooted aquatic plants use their roots chiefly as anchors, as has been hitherto supposed, and draw their nutrition wholly from the water, or whether they are nourished like other plants largely through the roots. In order to determine this point Mr. Pond cultivated one of the species of plants common at Put-in Bay under two sets of conditions—i. e., so that the roots were in the soil and so that the roots were unable to reach the soil. Some of the plants were grown in aquaria in the laboratory, while others were grown in the lake. The results in both cases were very striking, and showed that in a comparatively short time plants that were rooted in the soil made a gain of about 30 per cent over those that were not thus rooted. If this rule holds for other species of plants it is a matter of considerable practical importance. If rooted plants draw their nourishment only from the water they add nothing to the sum total of the primary food supply of the water. They take certain materials from the water for their growth and return these materials to



the water again when they decay. If on the other hand the rooted plants draw nourishment from the soil, when they decay this material or a part of it passes into solution in the water. Thus the plants would serve as a continual go-between between the soil and the water, extracting from the soil and adding to the water plant food materials. These food materials would then serve for the nutrition of the aquatic algæ, upon which all of the animals of the water depend either directly or indirectly for their food.

During August a 90-foot steam yacht was hired and used in transporting from point to point a camping party in charge of Dr. Hill, engaged in collecting animal forms along the shores of the lake. Mr. Lewis gave special attention to the parasites of the lake fishes. All the organs of each fish examined were systematically searched for parasites, the results recorded, and the parasites preserved. Mr. McClellan collected bryozoa, flatworms, and leeches, and Dr. Hill and Dr. Jennings the remaining invertebrates. The material preserved, which is without doubt the most complete invertebrate collection from the region, has been distributed to well-known specialists for identification, including Prof. E. A. Birge, of the University of Wisconsin; Dr. J. P. Moore, of the University of Pennsylvania; Dr. C. M. Child and Dr. C. B. Davenport, of the University of Chicago, and Mr. Raymond Pearl, of the University of Michigan.

The hired vessel was also employed in work on the plankton, under the immediate charge of Professor Reighard and Dr. Ward, and many deep-water hauls were made. The steamer *Shearwater*, belonging to the Commission, was likewise used to a limited extent.

Mrs. Jennings was engaged as artist and gave her time to making pen-and-ink and water-color drawings of algæ and living animals, especially those which do not retain their colors in the ordinary preserving fluids. Mrs. Jennings's work, which is of a high grade, has been placed in the hands of those who are studying the various groups.

#### WABASH BASIN, INDIANA.

In the summer of 1899 the Commission entered on a systematic study of the physical and biological features of the Wabash River and its tributary lakes and streams, under the direction of Prof. B. W. Evermann. Some inquiries were made in behalf of the Commission by members of the biological station of the Indiana University at Winona Lake, at Bass Lake in Starke County, and Bruce Lake and Tippecanoe River in Fulton County, and several other waters were also examined; but the principal work of the season was addressed to Lake Maxinkuckee, in Marshall County. In view of the intimate relations which exist between the fishes, other animals, and plants of a lake, it seemed desirable for the Commission to make a comprehensive survey of some small body of water representative of the numerous lakes of glacial origin in the Upper Mississippi Valley. Maxinkuckee was selected as being typical of that class, and, in addition, is conveniently located, is a popular resort for fishermen, and has a rich fauna and flora.



Investigations were begun July 1 and continued until the latter part of October. Professor Evermann was assisted by Dr. J. T. Scovell, Prof. C. H. Eigenmann, Messrs. T. B. Evermann, R. S. Gillum, C. Juday, Leonard Young, and T. Large. Both the biological and physical conditions of the lake were carefully studied, and much useful information was collected for the period mentioned. Many lines of soundings, with conjoint temperature observations, were run across the lake, and the location and extent of the bars and deep holes were determined. A sounding machine adapted for use from a rowboat was especially designed and constructed for this work. Material for cataloguing most of the groups of animals of the lake was collected, and many data were obtained regarding the habits, distribution, food, growth, abundance, etc., of the various animals, the fishes naturally receiving most attention. The species of plants in the lake were determined, together with the maximum and minimum depth at which each is found; many of the patches of vegetation on the bottom were mapped out, and the animals associated with each kind of plant were noted. It is proposed to continue the investigations and provide for observations at other seasons of the year.

#### LAKE MATTAMUSKEET, NORTH CAROLINA.

In the winter of 1899-1900, while the *Fish Hawk* was engaged in surveying the oyster-grounds of Pamlico Sound, Dr. John D. Milligan, of the vessel, was detailed to visit Lake Mattamuskeet and determine the nature of its fish fauna and the fisheries therein prosecuted. A number of trips were made, specimens were collected by means of a fine-meshed seine, and information was obtained by personal observation and from the people living near the shores. Although the winter is an unfavorable time for examining the lake, much information was gathered and a good idea of the character of the fish life was obtained.

The following account is taken from Dr. Milligan's report:

This, the largest lake in North Carolina, is situated in Hyde County; its length is 14 miles and its greatest width 7 miles. The water is very shallow, being only  $2\frac{1}{2}$  feet deep over a large part and having a maximum depth of 7 feet in the middle of the western end. In winter and early spring the lake is muddy and roily, owing to strong winds stirring the bottom and to the suspension of light soil and vegetable matter brought from the swamps and farm lands; but in summer the water is generally clear, with a brownish color, and is what is known as "juniper water." The bottom is mostly of fine sand mixed with mud, and is fairly hard.

This section was at one time inhabited by a tribe of Indians, and the lake has received the tribal name of Mattamuskeet. The Indian tradition as to the origin of the lake—which is the popular one to-day—is that it was due to a fire which burned many months, affecting a far larger area than is now covered by the lake. In support of this theory the people point out the blackened and water-worn cypress stumps everywhere abundant near the shores, and argue that the surrounding territory, being swampy and peaty and covered with cypress trees, is even now liable to have just such another fire. Prof. J. A. Holmes, of the North Carolina Geological Survey, states that this tradition is untenable and that Mattamuskeet, like others with the same story of origin—Lake Drummond, in the Dismal Swamp, for instance—is a natural lake.

The lake is fed by draining from swamps and farm lands and discharges through a canal which begins near Lake Landing on the southeast shore and ends in Yeosocking Bay, Pamlico Sound. The northern and western shores are swampy and marshy, while on the south and east there are extensive farms, generally dry and very fertile. Cypress and willow trees form an almost continuous border around the lake and grow far out into it.

The lake supports but little sport fishing and no market fishing, although considerable quantities of fish are taken for local consumption with rod and line and gill net. The turbid and brown water renders the nets less conspicuous and this increases their effectiveness.

While the variety of food-fishes found in the lake is rather small, it embraces a number of first-class species. The most highly prized and the most important from a local standpoint is the white perch (*Morone americana*), which is exceedingly abundant, reaches a large size, and occurs everywhere in the lake and drainage ditches. The yellow perch (*Perca flavescens*), locally called "redfin," is also abundant, but less so than formerly. The blue bream (*Lepomis pallidus*) is very common and ranks next to the white perch in popular estimation. The largemouth black bass (*Micropterus salmoides*), having the local names of "chub" and "welshman," is present in considerable numbers. The pike (*Lucius reticulatus*) attains a large size and is numerous, and the pickerel (*Lucius americanus*), called "jack," also occurs. Cat-fish (*Ameiurus catus*, and doubtless other species) and eels are abundant. The latter are not much used, although at one time a religious sect called "The Sanctified" made a business of catching eels in the lake and shipping them north.

The only effort to stock the lake seems to have been with carp, about 10 years ago, and was fairly successful, although the fish is not highly regarded in the community. After the West Indian hurricane in August, 1899, a cartload of large carp was found in a hole near the south shore of the lake.

Other species found in the lake are the little sun-fish (*Enneacanthus gloriosus*), the common sun-fish or pumpkin-seed (*Eupomotis gibbosus*), the darter (*Boleithys fusiformis*), the roach or shiner (*Abramis chrysoleucas*), the stone cat (*Noturus gyrinus*), the dog-fish (*Amia calva*), the hog-choker (*Achirus fasciatus*), the silverside (*Menidia beryllina*), and minnow (*Notropis*).

Besides fishes, shrimp (*Palæmonetes*) and crayfish (*Cambarus*) are abundant, and the blue crab (*Callinectes*) has been found in the canal and in the lake near the outlet. Turtles and terrapin abound, and water snakes are numerous, the "moccasin" (*Tropidonotus*) being most plentiful. Alligators are present, but are not common.

#### CALIFORNIA, OREGON, AND ARIZONA.

During the first half of the fiscal year Mr. Cloudsley Rutter resumed his special study of the chinook salmon of the Sacramento Basin, and at the same time carried on an investigation of the general fish fauna of the region. He also visited the headwaters of many of the eastern tributaries of the Sacramento River, where no salmon run, and made interesting observations on the fishes and large collections. Between December and July Mr. Rutter was engaged in laboratory work, studying the collections, preparing his reports, and compiling data for an article on the embryology of the salmon as a part of the monograph on the life-history of the species now in course of preparation.

In continuation of the ichthyological examinations of the Pacific coast, referred to in previous reports, a party under charge of Prof. Charles H. Gilbert, of Stanford University, visited the streams between

the northern boundary of California and the Columbia River. The field work began on July 1 and continued until September 27. The results of this season's investigations will be combined with those of 1897, when a similar party explored the coastal streams between San Francisco and the Oregon line. A report on this work is shortly expected from Dr. Gilbert.

Dr. P. H. Kirsch continued his volunteer services in determining the fish fauna of the San Pedro River, devoting a few weeks to the work in the summer of 1899. Only a short stretch of the river now remains to be canvassed, and on its completion a report on the fishes of this interesting tributary of the Colorado will be issued.

#### AQUATIC FAUNA OF PORTO RICO.

The extensive collections made by the *Fish Hawk* in Porto Rico in the winter of 1898-99 have been distributed among specialists for study and report, with a view to the publication of a comprehensive work on the animals found in the fresh and salt waters of the island. The absence of information regarding the water fauna, the influx of new people, and the inevitable development of the fishing industry, appeared to the Commission to warrant the publication of a work containing descriptions of the animals and illustrations of many of the most important, so that it might be possible for those persons not experts to identify them. The specimens representing the following groups were assigned to the specialists named:

Fishes and other vertebrates, Prof. B. W. Evermann and Mr. M. C. Marsh, U. S. Fish Commission; tunicates, Dr. George Lefevre, Baltimore; mollusks, Dr. W. H. Dall and Mr. Charles T. Simpson, U. S. National Museum; stomatopods, Dr. Robert P. Bigelow, Massachusetts Institute of Technology, Boston; macrurans and brachyurans, Miss M. J. Rathbun, U. S. National Museum; anomurans, Mr. James E. Benedict, U. S. National Museum; isopods, Dr. H. F. Moore, U. S. Fish Commission; leeches, Dr. J. Percy Moore, University of Pennsylvania; polychætes, Dr. A. L. Treadwell, Miami University, Oxford, Ohio; oligochætes, Dr. H. F. Moore; nemertean and planarian worms, Dr. Wesley R. Coe, Yale University; sipunculids and echiurids, Prof. Henry B. Ward, University of Nebraska; holothurians, echini, star-fishes, and ophiurans, Prof. Hubert L. Clark, Olivet College, Olivet, Mich.; crinoids, Prof. W. M. Wheeler, University of Texas; alcyonarians and gorgonians, Prof. C. W. Hargitt, University of Syracuse; corals, Dr. T. Wayland Vaughan, U. S. Geological Survey; sea anemones, Mr. J. E. Duerden, Kingston, Jamaica; sponges, Prof. H. V. Wilson, University of North Carolina; foraminifera, Dr. James M. Flint, U. S. N.; marine algæ, Prof. O. F. Cook, U. S. National Museum.

The study of many of the groups has been completed, and the publication of the reports thereon has begun. It is thought that reports on all the groups will be published during the fiscal year 1901.



## THE ALBATROSS SOUTH SEA EXPEDITION.

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By H. F. MOORE, *Naturalist of the Albatross.*

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In advance of the complete reports of the scientific expedition to the South Seas of the U. S. Fish Commission steamer *Albatross*, which will be published in the Bulletin of this Commission, the following outline of the cruise is submitted:

The vessel, under the command of Commander Jefferson F. Moser, U. S. N., sailed from San Francisco on August 23, 1899. The scientific work was under the direction of Mr. Alexander Agassiz, assisted by a civilian staff composed of Messrs. A. G. Mayer and W. McM. Woodworth, of the Museum of Comparative Zoology; Mr. Maximilian Agassiz, of Newport, and Messrs. C. H. Townsend, H. F. Moore, A. B. Alexander, and H. C. Fassett, of the Fish Commission. The naval officers attached to the ship at all times showed great interest in the work of the expedition and furthered it by all means in their power. They were Lieuts. Hugh Rodman and B. K. McMorris, Ensigns A. J. Hepburn, C. R. Miller, and C. S. Kempff, Surgeon J. C. Pryor, and Paymaster Grey Skipwith.

Between San Francisco and Nukahiva, in the Marquesas Archipelago, the first objective point, 26 soundings were made, resulting in the development of a basin from 2,500 to 3,100 fathoms deep, lying between latitudes  $24^{\circ} 30' N.$  and  $6^{\circ} 25' N.$ , and probably extending at least between longitudes  $120^{\circ} W.$  and  $140^{\circ} W.$  For this great oceanic depression Mr. Agassiz has proposed the name of Moser Basin. The floor of the Pacific over this depression, as, indeed, in a larger part of the deep waters explored by the *Albatross*, appears to be pretty completely covered with a deposit of red clay and manganese. The character of the deposit varies at different stations, being sometimes in the form of slabs, but more often composed of rounded nodules of various sizes up to 6 inches in diameter, sometimes smooth and sometimes mammilated, and often inclosing or partially inclosing the teeth of sharks and the hard ear-bones of cetaceans. In the deep waters where the manganese is not found the bottom consists usually of globigerina ooze, gradually changing to pteropod ooze as the depths decrease, then to fine and finally to coarse coral sand as the coral islands are approached, or to volcanic mud and volcanic sand in the vicinity of volcanic groups like the Marquesas and Society islands.

On the morning of September 14, 22 days out of San Francisco, the high island of Ua-Huka, in the Marquesas Group, was sighted, and



the afternoon of that day and the early hours of the following morning were spent in sounding and using the beam trawl and tow nets in the channel between that island and Nukahiva. Between the islands a depth of 830 fathoms was found and the trawl hauls developed an apparently rich bottom, but the nets were so badly damaged by the rocks that comparatively few specimens were obtained.

At 9.30 a. m. on September 15 the anchor was let go in the harbor of Tai-o-hae, Nukahiva Island. This harbor, with a comparatively narrow entrance, is surrounded by high hills sloping almost from the water's edge, and has the appearance of an ancient crater, the seaward walls of which have broken down and admitted the waters of the Pacific. Tai-o-hae is the seat of the French government in the Marquesas Islands, and the members of the expedition were received with great kindness by the government officials and residents. Two days were spent in coaling and the members of the scientific staff utilized the time in making collections on shore. The natives in the vicinity of Tai-o-hae have adopted many of the outward forms of civilization, and many of them live in houses of European architecture of a simple type. In the interior, however, more of the ancient life is to be seen and houses of pure native construction, invariably built on stone platforms, are common, in fact, almost universal. In the forests are found the sites of many old villages, now overgrown with large trees and in some cases almost hidden by vegetation.

The population of the island is decreasing, probably as a result of changes in their mode of life and the introduction of diseases unknown before the advent of the whites, and as a rule the people are subdued in demeanor and apparently convinced that their race is doomed to extinction. The Marquesas Islanders are among the few South Sea Islanders (of whom the ancient dwellers on Easter Island are the most notable) possessing the art of stone carving. Several specimens of rude idols were seen, and the members of the party who had the best opportunity for observing are of the opinion that they are still objects of some veneration, if not of worship.

About noon on September 17 anchor was weighed and the *Albatross* stood out of the harbor for the northwestern end of the Paumotu Archipelago, en route to Tahiti. Soundings were made on this line which, when considered in connection with those obtained before reaching Nukahiva, appear to indicate that the submarine plateau from which the Marquesas Islands arise has a depth of about 2,000 fathoms and a width of 50 miles.

On September 20 Ahii, the first of the low islands, was sighted and before noon of the following day the ship, under the pilotage of a native, entered the lagoon of Rairoa, through Avatoru Pass, and came to anchor. Three days were spent in examining the atoll and making collections. A line of soundings was run across the lagoon, which is the largest in the Paumotus, developing the fact that it has a practically level floor with a depth not exceeding 20 fathoms. This line

was subsequently extended seaward at each end for a distance of several miles, in order to develop the submarine insular slope.

After leaving Rairoa the atolls of Mataiwa and Tikehau were examined from the ship and a landing for a few hours was made at Makatea, an elevated coral island of considerable interest. The cruise was then continued to Tahiti, in the Society Islands, where coal and supplies were to be obtained for the cruise through the Paumotus.

Tahiti was sighted at daylight on September 27 and the anchor dropped in Papeete Harbor on the afternoon of the same day. A week was spent at this port in coaling, laying in supplies, and making minor repairs and overhauling the engine. The naturalists of the party utilized the time in collecting on shore and on the reefs. The harbor is protected from the sea by a barrier reef, part of a long stretch which practically encircles the island, changing from fringing reef to barrier reef, and conversely, as it establishes or loses its connection with the main island. Opposite Papeete the reef is interrupted by a pass, one of many which occur at intervals, through which shipping gains access to the harbor. Papeete is the seat of the French colonial government in the South Sea Islands. It has a garrison of about 200 men, and a cruiser is usually lying in the harbor. The United States and several European governments are represented here by consuls, who are accredited to the French South Sea possessions as a whole. The population is said to be about 5,000, of whom a large number are whites engaged in trade or connected with the government of the island.

On October 5 the *Albatross* sailed from Papeete for a cruise through the Paumotu Archipelago, during the course of which Makatea was revisited and about twenty-five other islands, of which Pinaki was the easternmost, were examined. During this cruise much information was gathered concerning the formation of the islands of the Paumotus, which furnish a fairly complete series, from the typical atolls like Rairoa to the elevated coral plateau of Makatea.

A landing was made at Makatea and a party crossed the island to a village on the east side. The top of the coral table-land exhibited a slight depression in the interior, and the rocks are eroded by subaerial agencies into a picturesque diversity of caverns, small canyons, and pinnacles, unlike anything seen elsewhere on the cruise. The precipitous walls, which in places rise sheer from the sea, and elsewhere are fringed with narrow beaches and reef flats, by their terraces and lines of caverns eroded by the waves, indicate that the island has passed through four periods of elevation. The cliffs are most precipitous on the weather side, and the terraces best developed on the more sheltered shores. The vegetation is richer and more varied than on the low islands of the Paumotus subsequently visited.

Stops varying in length from six days to an hour or two were made at a number of the islands, and wherever opportunities occurred collections were made by the naturalists of the expedition. The trawl and dredge hauls, which were in depths of from 725 to 2,440

fathoms, yielded but meager results, and the surface and intermediate tow nets also took but little. The collecting on the reefs and in the shallow water was unproductive, as compared with similar collections in the West Indies, although some interesting forms occurred in considerable abundance. About 100 soundings were made in this part of the cruise, and the contour of the bottom and the extent of the main Paumotu plateau west of Pinaki were fairly delineated.

In that part of the Paumotu Archipelago visited by the *Albatross* the natives showed, in their habitations, boats, utensils, and mode of life, the influence of somewhat intimate contact with the whites. On some of the larger islands are stationed gens d'armes, the local representatives of the French colonial government, and traders and missionaries are found almost everywhere. Nukatavake was the only island where the expedition noted any approach to primitive conditions, and the stop there was too short to enable the members of the party to make more than the most casual observations. It is probable that in the eastern islands more of the old life obtains than in those parts of the archipelago in more immediate communication with Tahiti. The people are much under the influence of missionaries, mostly Tahitians, although some are whites, and while their morality is perhaps not all that could be desired, they exhibit considerable zeal in their religious observances and some rivalry between the various sects. At Pakaka, on Apataki, with a population of perhaps 200, the members of the expedition observed four churches, and were informed that there was one more, a representation which it would be difficult to duplicate in a village of the same size in the United States.

Three days were spent at anchor in the lagoon off Rotoava on Fakarava, where is located the French residency for the Paumotu Archipelago. Like most of the larger villages of the eastern Paumotus, Rotoava is well kept, with a broad main road shaded by cocoanut trees stretching along the lagoon front, the coral soil compacted to a smoothness resembling concrete. The usual collections and observations were made and the ship sailed on October 14. A stop of very short duration was made at Anaa, an island rich in cocoanut trees and supporting the densest population in the archipelago. A curious fish trap or weir, constructed of coral rocks, was observed on the reefs at this place, the fish being removed from it at low water with dip nets. The lagoon of Anaa is one of great beauty, and its brilliant colors reflected on the clouds were visible many miles away, long before the island itself was sighted.

After leaving Anaa the islands of Tahanea, Tuanaka, Raroia, Takume, and Taenga were visited, but the first stop, six days, was made at Makemo, where bad weather delayed the arrival of a coal supply ordered from Papeete. The naval officers utilized the enforced stay in making a survey of Northeast Pass and its anchorage, which have been inadequately charted, and in carrying on magnetic and astronomical observations of value to mariners. The reef flat in the

sea face of Makemo is narrower than at Rairoa, and its outer edge is extremely rugged, with gnarled tongues of nullipore-covered rock thrust seaward, leaving between them gullies in which the water wells with the surf. In places where the end walls of the gullies are abrupt the heavy swells, which roll almost unceasingly in this region of the trades, dash vertically aloft in spouts sometimes 20 feet or more in height. The nullipores grow most luxuriantly in those parts of the reef which are reached by the spray, and consequently the sea verge of the reef is raised above the level of the flats behind, and around the blowholes there is usually a partial rim, which slopes away like the flanks of a crater. At Makemo and nearly all islands where the outer edge of the reef has a nullipore ridge with a comparatively narrow reef flat behind there is a channel about a foot in depth, through which the water dashed over the rim flows in rather swift currents parallel with the shore, until it finds a lateral channel permitting it to flow back to the sea. In some places at Makemo, Fakarava, and elsewhere this canal is incompletely eroded, and consists of a network of small channels from 6 to 18 inches in depth, where the sand and fragments of coral rock washed back and forth by the currents show clearly the mechanical agents by which the scouring out of the ledge rock has been effected. At Makemo there is also a narrow cut, as yet but 2 to 4 feet deep, through which the tide rushes into the lagoon at high water and which is doubtless a pass in embryo. A contemplation of this and various other cuts in different stages of formation was convincing that passages through the rims of atolls are, at least sometimes, formed by erosion rather than by discontinuity in the growth of corals. After the cut has once reached a depth where the sea has access to it at or near low water the cutting away of the rocks must proceed more rapidly, as swift currents are continually discharging through the gaps on the lee side of the atolls the vast quantities of water which the waves wash over the low rims of reef on the weather side. In some of the passes of the Paumotus there is a current of 7 or 8 knots flowing from the lagoon seaward which is sometimes merely checked and not reversed, even at high water.

Hikueru was visited principally for the purpose of examining the pearl fishery in the lagoon, which has no entrance sufficiently deep to float even a large boat, the small sloops and catboats used in the fishery being dragged and carried over low places in the reefs. The lagoon is opened to fishing one year out of three, when the small resident population is augmented by a heavy influx from most of the Paumotu Islands and some of the Society group—at the time of the visit of the *Albatross* it being estimated that over 3,000 persons were on the island. The fishery is carried on entirely by naked native divers—men, women, and the larger children. The men frequently go to a depth of 15 fathoms, staying under water from two to three minutes, and the best divers are said to sometimes reach a depth of 20 fathoms. The members of the party saw a man bring up several

shells from water 14 fathoms deep, after an immersion of two minutes and forty seconds. The yield of mother-of-pearl is large, but apparently decreasing. Pearls are not so frequently found here as in other islands of the archipelago where the shells are less abundant.

After leaving Hikueru a stop was made at Nukatavake, as before mentioned, and a landing was also made at Pinaki, where the lagoon was found almost inclosed, shoal, with over 100 small islets of *Tridacna* shells, and apparently in process of filling up.

From Pinaki the *Albatross* went to the Gloucester Islands, where valuable observations were made, and then via Mehetia to Tahiti.

On November 6 the expedition again arrived at Papeete, where it remained until November 15, coaling and refitting. During both this and the first visit the expedition was received with much courtesy by the people of Papeete, who, in addition to the extension of hospitality, in a number of cases provided facilities and rendered assistance to the members of the party in carrying on their work. In addition to the shore and reef collection, several members of the party examined most of the valleys in the vicinity of Papeete, and made soundings and observations in Lake Vaihiria. The population of the island is restricted to a narrow fringe around the coast, the interior, with its high peaks and narrow spurs, separating equally narrow valleys, being ill adapted to the temperament and necessities of an ease-loving people like the Polynesians. A road, mostly in good condition, encircles the island, and, with the sea, affords the sole means of communication. The reef skirting Tahiti is principally of the barrier type, sheltering a channel from the sea and affording a smooth passage for small craft navigating the coast. In some places the channel is of sufficient depth to afford passage and harbor to vessels drawing 15 feet, and the steamers, which come several times a year to load fruits for the Australasian colonies, are able to take berths near the plantations from which they draw their supplies.

The soil of Tahiti, as is usual in volcanic islands, is fertile and the vegetation luxuriant. Cotton and sugar are produced, but appear to be less important than formerly. Coffee grows almost within reach of the sea. There is an increasing production of vanilla, which is said to be of excellent quality, and the oranges grown on the island are unsurpassed. The plantations are all on the strip of lowland along the coast and in the lower and broader portions of the numerous valleys which furrow the island radially from the high interior. Papeete, the capital, has a trade of some importance, being the distributing point for the entire French South Sea Establishments and the port of transshipment of their products of copra and pearl shell.

The beauty of the island is unsurpassed by anything seen on the cruise. Its high, rugged mountains, one exceeding and several others almost equaling 7,000 feet in height, the many cascades and waterfalls plunging over precipitous valley walls or leaping from ledge to ledge on the flanks of the ridges, its dales and valleys, with rapid



coursing streams and wealth of tropical verdure, form the elements of a picture as rich in detail as it is bold in ensemble.

The shore line is fringed with cocoanut palms, and the small sandy islands on the reef are given up to the culture of the same tree. Much of the uncultivated land along the coast and in the lower parts of the valleys is given up to dense thickets of guavas, which, since their introduction some years ago, have, together with the lantanas, spread with such amazing rapidity that they have become a nuisance. In the upper parts of the valleys the wild plantain, or "fei," with its great upright bunches of fruit, as distinguished from the drooping bunches of the banana, grows in abundance and is an important item in the dietary of the natives, who carry it to their homes along the coast. Wild oranges, limes, and shaddocks are common and excellent in quality; calladiums grow in the marshy spots; tradescantias in places almost choke the streams; and along their damp margins, where level tracts free of rocks occur, a species of wild ginger, the rhizomes of which are used in making a native curry, grows in dense thickets, and in November exhales a delicious aromatic odor from its flowers, just peeping a few inches above the ground. Higher up the valleys dracænas and tree ferns occur, tillandsias and the bird's-nest fern depend from the larger trees; clambering vines, creeping pandanus, and the giant fern abound among the rocks; a variety of trees, including an occasional sandalwood, clothe the hillsides, and a host of small and delicate plants cling to the precipitous rock faces, where dripping waters keep them perennially moist.

In the streams the gamy little perch-like *Dula* lies in the pools, shrimps of the genus *Atya* court the shelter of stones and aquatic vegetation, and a crab of the family *Thelphusidæ* scales the vertical faces of the overhanging rocks with astonishing celerity and always out of reach. A little kingfisher is always found along the streams and their dry beds, apparently depending more upon insects, which it catches on the wing, than upon the usual food of its kind, and in the woods are at least two species of pigeons and other smaller species. A large hawk was also several times observed attempting to catch the ducks which make Lake Vaihiria their home, but it is said to be an imported species. High up the valleys the frigate bird is always to be seen sailing about the almost inaccessible crags where it makes its nest, and a little white tern is commonly seen in Tahiti, as at Nukahiva, far inland, and occasionally resting upon the trees.

On the reefs the fauna is hardly more rich than in the Paumotu. The living corals are in most places neither abundant nor varied. The solitary fungia is scattered over the reef flats, in shoal water, and there are patches of reef-forming corals about the edges of the dead rock, and more or less impoverished-looking clusters on its submerged top, but nowhere apparently are there flourishing masses such as were seen in the pass at Rairoa. Gorgonians and Alcyonaria generally are poorly represented in both the Society and Paumotu archipelagoes;



several species of starfish are common, but not abundant, and there are 4 or 5 species of sea-urchins and several holothurians. A species of *Grapsidæ* is common about the rocks along the shore and exposed on the reefs, and by raising the coral fragments and breaking them in pieces several small crabs were found, together with stomatopods and shrimps and prawns and other species of crustacea, and a number of worms were collected in the same manner, although less extensively than in the Paumotus.

Tahiti proved interesting and attractive, especially on the second visit, after the monotony of the atolls of the Paumotus, and it was left with some regret on the morning of November 15.

Some of the Leeward Islands of the Society group were visited, with anchorages overnight at Tahaa and Bora Bora, and a short stop was made at Aitutake, in the Cook group. The Leeward Islands, like the rest of the Society group, consist of bold and picturesque volcanic peaks skirted by coral reefs and reef islets on a broad shore platform, and Aitutaki resembles them, but its peaks are low and its structural features in general on a smaller scale.

The next place visited was Niue, an isolated, elevated, coral island, with bold precipitous terraced walls, rising to a height of from 150 to 200 feet above the sea. The surface of the island is comparatively level and less elaborately sculptured by erosion than is Makatea, which it resembles in a general way. The vegetation is far inferior in luxuriance and variety to that of the Society Islands, but excels that of the atolls of the Paumotus. Some attempt has been made to raise sugar, but the fields did not look promising.

From Niue the *Albatross* steamed to latitude  $21^{\circ} 18' S.$ , longitude  $173^{\circ} 31' W.$ , where a sounding and Blake trawl haul were made in 4,173 fathoms, the greatest depth at which a trawl has ever been used. A species of sponge, allied to a form before known only from comparatively shallow water, was taken. In latitude  $21^{\circ} 18' S.$ , longitude  $173^{\circ} 51' W.$ , a sounding of 4,540 fathoms was obtained.

Early in the morning of November 28 the magnificent cliffs of Eua were sighted, and just before noon, after coasting the east, south, and part of the west shores of the island, anchor was dropped in English Roads, off Ohonua village. The east side of Eua presents the highest and finest coralliferous limestone cliffs seen during the cruise, and they excited the admiration of all on board. Eua was left on the following morning after an examination of its general features, and a short run was made to Nukalofa, the capital of the Tonga Islands, where the members of the expedition were kindly received by King George, the officers of his government, and the people. The government of the Tonga group is a limited monarchy under the control of the natives, and the islands appear to be well conducted and orderly. Tongatabu, on which the capital is situated, is somewhat elevated in its southern part, but slopes gradually away to the northward, where it is continued over the plateau as a number of small islets and reefs.

The interior of the island is level and the soil apparently fertile and cultivated more or less by the natives, who ship their fruits to the English colonies in Australasia. A large proportion of the people are owners of a horse or two, which they use in their agricultural operations and for the transportation of their products to the coast.

The collections here were not extensive, as the reef and waters in the neighborhood of the anchorage exhibited an unusual paucity of life. A trip was made to the village of Hihifa, where there is a remarkable rookery of fruit bats, occupying about fifteen adjoining trees and estimated to contain upward of 6,000 individuals. Although these animals destroy considerable quantities of fruit, they are "tapu" and under the immediate protection of the chief of Hihifa. They are not permitted to be shot or molested in any manner, and it was only after considerable negotiation that the members of the expedition were allowed to catch three specimens, which were taken back to the ship alive. Nowhere else on the cruise were fruit bats of this or any other species found in colonies of more than a score.

After leaving Nukalofa, the Namuka and Vavau groups of the Tonga Archipelago were visited and examined with relation to their exposed and submarine structure. At Namuka Iki there is a small area of stratified volcanic rock, soft and friable, and said to resemble somewhat the so-called soapstone of the Fiji Islands. Namuka Iki is the convict settlement of the Tonga Islands. A number of rude huts were seen on the island, some of them showing indications of quite recent habitation, and several recently cultivated yam plantations were observed, but the inhabitants, who are few in number, kept out of sight. Namuka Island, from Namuka Iki but a few miles distant, is composed of uplifted coralliferous limestone, the weather shore being extremely rugged and much eroded by the seas. In the interior are several rounded eminences of moderate height, but upon examination these were also found to be composed of limestone.

Residents of Namuka stated that some of the islands of the group are volcanic, and those seen from the ship appeared to be. The Namuka Group is, therefore, of mixed formation, partially volcanic and partially of elevated coral limestone.

From Namuka the course lay between the western chain of volcanic islands and the plateaus of the Namuka, Hapai, and Vavau groups. Lette, of the volcanic chain, is still active and some of the others have been the scene of recent activity. Falcon Island, which appeared above the sea in 1885 as a low volcano, with a cone of loosely compacted ash and scorix, had been entirely washed away by 1898 and reduced to the condition of a breaking reef, much as it appeared when first discovered in 1865.

No landings were made on the islands of the Hapai plateau, but some of the westernmost were seen to be limestone islands of considerable height. The Vavau Group, comprising the most northern islands of the Tonga Archipelago, is one of picturesque beauty. The northern

part of the principal island, Vavau, is high and bold, with precipitous shores, but it slopes away to the southward where it breaks up into an intricate maze of headlands and islands, gradually decreasing in size and height until they are lost beneath the sea as breaking reefs on the southern edge of the plateau. This archipelago of islets is evidently the eroded remnant of a single high coral island, of which Vavau is the largest fragment, which formerly covered the entire plateau and was, perhaps, connected with the Hapai Group.

The *Albatross* anchored at Neiafu, Vavau, on the morning of December 4 and left in the afternoon of the following day. The harbor is well protected, but the water is rather deep. It is approached through a fine fiord with precipitous coralliferous limestone walls, from which a number of flat-topped rocks and islets have been cut off by the erosive action of the sea. At Neiafu the rocky walls of the fiord are interrupted and a broad slope extending into the interior gives room for the village and an ample cultivated acreage behind it. Several trading stations are situated along the cove, one on the star-board side in entering being in a situation of almost idyllic beauty.

The island is generally well wooded and produces a variety of fruits and vegetables. The natives are of the Maori race, like those of Hawaii, Samoa, and the islands which the *Albatross* visited to the eastward. Here, as in the other islands of the group, tapa, the bark cloth of the South Seas, is produced in considerable quantities, and the rap rap of the tapa club is heard everywhere and all day long. A few corals were collected at Neiafu, but the other collections were poor.

From Vavau the vessel ran to the Fiji Islands, making a short stop at Kambara in the Lau Group, and then proceeding to Suva, where nine days were spent in refitting and coaling. A number of cases of specimens were packed up and shipped from this port, previous shipments having been made from Papeete.

Suva is the seat of the British Government in the Fiji islands, and the expedition was kindly received by the colonial officials, who, among other courtesies, provided an excellent guide and carriers for a party which visited the interior. The town has a population of less than 2,000, of whom a large proportion are whites. The harbor is good, protected from the prevailing easterly winds by a high point and from the swell of the open sea by a coral reef traversed by a deep pass which forms the entrance. The anchorage is good, and vessels of considerable draft can lie alongside the wharf. Extensive collections having been made by Mr. Agassiz on a former expedition to the Fijis, but little collecting was done along the coast, and three members of the party made an excursion into the interior of Viti Levu, the principal island of the archipelago.

This island is the largest and most populous visited by the *Albatross*. Its interior is mountainous, but the peaks are neither so high nor steep as those of Tahiti, about 4,000 feet being the greatest altitude, and the valleys are broader. The principal river, the Rewa, entering the

sea a few miles east of Suva through an extensive delta, is a broad stream navigable for light-draft steamers for a distance of 30 miles or more from its mouth. Launches make daily trips from plantations up the river to Suva, and it is important as an avenue for the transportation of cane to the mills, substantial steel barges towed by launches being used for the purpose. The natives also carry their fruit and produce on bamboo rafts, which are floated downstream to the delta and thence to Suva. The valley of the Rewa is populous and fertile, and a number of plantations are located on its banks. Oranges and related fruits, which in a feral state abound in the Society Islands, were rarely seen growing wild in Viti Levu, and the fei, although it probably occurs, does not hold an important place in the diet of the natives, who subsist largely on fish, yams, taro, and bread-fruit. As in all the volcanic islands visited, as contrasted with the atolls, the meat of the cocoanut is not much eaten, though its oil is used in preparing certain dishes and its water is used as a beverage. A sort of glutinous pudding, prepared by pounding up cooked taro with cocoanut oil, is highly regarded as a delicacy, and the stone pestles used in its preparation are found in every household. The Fijians, like the Samoans, Tongans, and other Polynesians, drink kava, which is an infusion of the comminuted roots of a species of pepper (*Micropiper*). Formerly the green roots were reduced to a pulp by mastication, but for hygienic reasons this has been prohibited; and the dried roots are now pounded in a mortar or grated. The beverage is not fermented, and intoxicating properties are denied to it by recent investigators.

The weather side of the island is well wooded and fertile, the vegetation is luxuriant and in general more massive in character than in Tahiti, and the filmy growths of tropical forests are less conspicuous.

The Fijians are a sturdy, independent race with dark skins and fine physiques. The women have less beauty than those of the Maori race, but many of the men are fine specimens of vigorous, athletic manhood. As a rule they are not given to toil, and to supply labor for the plantations there have been large importations of Indian coolies, whose physical inferiority to the natives is striking.

In the coastal regions of Viti Levu there is more or less admixture of Tongan blood, and the color, especially of the chiefs, is lighter than among the mountain people of purer Papuan descent. For the most part the natives live in houses of pure Fijian architecture, those of the chiefs, especially, being well constructed and often neatly kept. Some of them have the beams and pillars neatly and ingeniously ornamented with wrappings of cocoanut fiber sennit in various designs and colors, and in the house of the chief at Rewa the wood-work is hardly to be seen for the closeness of its ornamentation.

As chiefs of districts and villages the old native ruling classes have been given a certain amount of authority under the British colonial government, and the natives are well satisfied and contented without having lost their natural independence of character. As a race they

are intelligent, and some of the chiefs have been well educated in the schools of the Australasian colonies, speaking English with fluency and being well informed of the events of the world.

The common people and some of the chiefs live much as they did before the advent of the whites, excepting that they have, of course, long given up their tribal wars and some of the practices arising therefrom. Most of them are professed Christians and in form, at least, are more devout than some of their white neighbors. In the vicinity of Suva white influence is seen in the dress of the women, a cotton gown reaching to the ankles, and the men wear cotton loin cloths, or sulus, and shirts, the chiefs dressing in white. In the interior of Viti Levu, however, and at Kambara, the dress of many of the women is a skirt of fiber reaching to about the knees, and the men wear the sulu without covering to the upper part of body. Except in a few places, practically all of their household utensils are of home manufacture after their ancient models, and their villages are innocent of corrugated iron. A few large, double-sailing canoes are still to be seen, but there are none approaching in size the great war crafts of former times, and in the neighborhood of Suva, at least, they are fast giving place to sloops and cutters, whose general superiority the native appreciates.

Before reaching Suva four soundings, ranging between 324 and 600 fathoms, were made among the southern islands of the Lau Group, and another of 990 fathoms was made about 13 miles west of Kambara. After leaving Suva no soundings were made until in latitude  $12^{\circ} 43' S.$ , longitude  $179^{\circ} 50' W.$ , a depth of 1,445 fathoms was found about midway between Fiji and the Ellice Islands. The trawl and tow nets were used at this station with rather meager results and this constitutes practically the only work of the kind between Suva and Yokohama, although the surface net was used on several occasions. The following day a sounding of 245 fathoms was found at a point about half a mile south of Nurakita Island. This island, usually known as Sophia Island, is owned by a white man who has erected an apparently substantial building, and is inhabited by Samoans in his service.

From Nurakita the *Albatross* proceeded to Funafuti, when anchor was dropped in the lagoon off the village of Fongafale on the afternoon of December 23. Funafuti is one of the few atolls which have been well surveyed. It is almost 15 miles long and about 10 miles wide, its greatest length being nearly due north and south, and its width east and west, magnetic. The depth of the lagoon will average 24 fathoms, but it is considerably shoaler on the west side, and there are many reefs and coral patches scattered everywhere over the lagoon, these being readily recognized in the sunlight by the light-green color in contrast with the blue of the deeper water. Outside of the atoll the water is deep, soundings of 1,000 fathoms being obtainable within 2 or 3 miles of the shores and still deeper water being found beyond. Funafuti is, in fact, the summit of a steep submarine peak. The land lies on the eastern and southeastern rim of the



atoll and consists of a number of long and extremely narrow islands on the reef flats. It is widest, about 600 yards, at the easternmost point, where the village is situated, but elsewhere it is rarely a third as wide. A large part of the land consists of coarse coral shingle and rubble overgrown by an almost impenetrable scrub, but near the village it has a more sandy soil, supporting a growth of cocoanut trees. There is also in the vicinity of the village a slightly brackish sink or shallow pool where taro is grown and whose verge supports a few banana and breadfruit trees, the first that the expedition found growing on an atoll. In 1897 a boring 1,100 feet deep was made at Fongafale to determine the depth of the coral formation and the character of the underlying structure of the atoll.

The population of Fongafale, which is the only inhabited island on the atoll, is stated to be about 250, with a native government under the protection of the British flag. The natives are all Christian and extremely devout, Sunday being entirely devoted to religious observances and services at other times being frequent. On Sundays the men dress in shirts and trousers and some wear coats, and the women appear in loose flowing wrappers of cotton stuff and hats of a style never seen elsewhere, but which are the pride of their owners and the glory of Fongafale. On ordinary occasions the women wear nothing but a short skirt of pandanus-leaf strips sewed to a waistband.

The chief and one or two others have houses built of coral rock and plaster upon European models, but the majority of the dwellings are of native design, but of several types, as if extraneous influences had been at work. The most common type, and the one probably indigenous to the island, has a floor or platform over the whole or a large part of the space occupied by the house, raised about 2 feet above the ground, a sort of picket fence preventing the encroachment of pigs and dogs beneath. Another type is without a platform, but the ground is covered with a neat layer of white coral shingle and pebbles, over which mats are spread when one wishes to sit or lie down. Houses of this character, probably of Samoan origin, usually have no permanent walls, but a sort of native "venetian blind," made of broad mats of cocoanut leaves, is arranged so that it may be raised or lowered as occasion requires.

The natives of Funafuti are quite different in appearance from those of the Fiji Islands, belonging to the Maori race, which inhabits the islands to the eastward. During recent years, at least, they have had considerable intercourse with the Samoans, whom they resemble in appearance, and it is not improbable that the Ellice Islands were populated by emigration from the Samoan Archipelago, which is distant between 500 and 600 miles. A Samoan teacher was present on the island at the time of the visit of the *Albatross*, and so far as could be judged his influence was paramount to that of the chief. The natives were hospitable and kindly disposed, and exerted themselves for the pleasure and entertainment of the members of the expedition. With the exception of two Roman Catholic missionaries, who contem-

plated leaving on account of the coldness of their reception by the already Christianized natives, there were no white men resident on the island. The white trader had died several months before and no one had taken his place. The supply of tobacco, soap, and some other necessities was exhausted, and the members of the party availed themselves of an active demand for these articles in making collections of ethnological specimens, a fairly complete collection of fishing appliances being secured.

During the two days spent at Fongafale the naturalists of the party made collections of corals and other specimens on the reefs. Great difficulty was encountered in getting specimens of fish, not only at this island, but everywhere in the South Seas. It was rarely that fish could be taken on a line, and the few captured generally belonged to species of which specimens were easily obtainable. Places presenting opportunities for hauling the seines were comparatively few, owing to the coral growths on the bottoms of the lagoons, and on the outside of the atolls there were usually no places whatever where a net could be set. Gill nets were tried in a number of places and in several ways, and traps of various types were set where strange and gorgeously beautiful fish were swarming, but only the most meager results were obtained. Fishes in considerable numbers and variety could always be seen about the corals, but on the slightest alarm they would withdraw into the numerous holes and crannies, where they were secure against all attempts to catch them.

Attempts to secure specimens and fish for the officers' mess from the natives were no less abortive. The South Sea Islanders everywhere pay more or less attention to fishing, but in a desultory way and upon a small scale and, except when they go out to sea after flying-fish and bonito, rarely make catches of considerable size. In lagoon fishing they usually catch barely enough for a meal for themselves. They use a large variety of apparatus—traps differing in type in every group, but all made upon the principle of our own lobster pots, seines, dip nets, scoop nets, hooks and lines, and spears. The nets are nearly all made by the natives of twine composed of fibers indigenous to the islands, and many of the lines are also of home manufacture, although the cotton line of the whites is used more or less in many places. The natives generally exhibit considerable skill in making twine and cordage, and examples were seen which in strength and workmanship were not inferior to the products of machinery. Iron hooks obtained from traders are now extensively used in most of the islands, but in some cases barbless ones are preferred to the ordinary type, and for some kinds of fishing the native hooks of pearl shell and bone are found more effective. For catching the bonito and kindred species the natives and white residents of the islands claim that nothing equals a sort of native "fly," which, with slight modifications, was found everywhere from the Paumotus to the Marshalls. It consists of a pearl-shell shank to which a slightly curved and retrorse point

of bone or shell is firmly lashed and furnished with a tuft of stiff fiber to serve as a lure. For lagoon fishing a hook made of a single piece of lamellibranch or gasteropod shell is sometimes used, and for shark fishing recourse is still occasionally had to the ancient hard-wood hook; but both of these types have been largely displaced by iron and steel, in some cases the natives adapting the new materials to the old familiar models.

Iron wire has also almost displaced hard wood for the armament of the fish spears, although the old model, with its crown of six or eight points, is still adhered to from the Paumotus to the Carolines. Spear-fishing is practiced on the reefs at night when the flaring lights of cocoanut-leaf torches are used to lure the fishes from their hiding-places among the corals.

The *Albatross* left Funafuti on December 26, and sailed for the Gilbert Islands, coasting the island of Nukufetau en route. Between the Ellice and Gilbert islands she encountered much bad weather, with wind and rain, and it was found impossible to make soundings. In the Gilberts the islands of Arorai, Onoatua, Taputeuea, Apamama, Maiana, Tarawa, Apaiang, Maraki, and Taritari were coasted and examined. Landings for a few hours were made at most of them, excepting Taritari, where the ship entered the lagoon and lay at anchor for a day and a half off the village of Butaritari.

Eleven soundings were made in the Gilberts, and the indications are that these islands, like the Ellices, are the summits of rather steep submarine peaks rising from a depth of about 2,200 fathoms. No landing was made at Arorai, but natives who came off in a boat stated that there was a small sink or pond, but no lagoon. Maraki has a lagoon of considerable relative size, but, with the exception of two small, shallow passes, practicable for boats only, it is entirely inclosed. With the exception of Arorai and Maraki, all of the Gilbert Islands visited by the *Albatross* have lagoons, which are only imperfectly inclosed by land, the western part of the atolls, as a rule, consisting of reefs, without the sandy linear islets which characterize the weather side. Some of the atolls have a double fringe of islets, a peculiarity which was nowhere seen in the Paumotus, but which was afterwards noticed in certain of the atolls of the Marshall Archipelago.

On the morning of January 5 the ship entered the southern passage of Taritari atoll, under the guidance of a white pilot, and early in the afternoon came to anchor off the village of Butaritari, where she remained until the morning of January 7. The lagoon is full of coral patches of all sizes, from a few feet in diameter up to reefs of considerable size, and a collection of the characteristic species was obtained. The shore and reef collecting proved poor in those portions of the atoll within reach of the ship, and circumstances did not permit this branch of the work at any considerable distance from the anchorage. In company with some of the white residents and natives a trip was made to the reefs near the entrance for the purpose of making a collec-

tion of the reef-dwelling fishes by means of explosives, but the attempt was attended with but poor success, owing, the natives stated, to the fish having been scared away by previous operations. Explosives for catching the fishes on the reefs and poisons for taking them in the small tidewater pools, where, from their shy and secretive habits, it is difficult to secure them with nets, are perhaps the only feasible means of making extensive ichthyological collections under the conditions prevailing in the South Seas, and the expedition was handicapped by not possessing the means for working along these lines. On the whole, the biological collections on the coral islands were disappointing, and far less than similar effort would have yielded in the waters of the West Indies or on the coast of Japan.

At the various islands where stops were made a few ethnological specimens, principally fishing and canoe implements and articles of adornment, were gathered, but as a rule the time was too short for collecting of any sort. The houses differ somewhat in different islands, but typically consist of rather high cocoanut-thatch roofs supported on blocks of coral rock or posts about 3 feet high. Many of them, but not all, have floors on a level with the eaves, a scuttle or hatch giving access to the compartment above, which is used for sleeping purposes and as a storehouse. On some of the islands where no landing was made, e. g., Taputeuea, the corner stones, which are usually about 10 or 12 inches square in cross sections, were seen in places along the beach, sometimes quite in the open, on bare sand flats, the rest of the house having disappeared.

On all of the islands visited more or less attention is given to the cultivation of a large rank-growing species of taro, which has probably been introduced from some of the volcanic islands of other groups where it is indigenous. The taro patches are artificially constructed trenches dug in the sandy soil and usually for some distance into the underlying coral rock and filled with an accumulation of vegetable mold, which lying, as it were, in a more or less impervious basin, is kept constantly moist by the rains. These beds are carefully cultivated and fertilized by household refuse and other materials, the soil from time to time being loosened up and added to by materials sifted through a sieve of cocoanut fiber. At Apamama a spade made of a pearl shell lashed in a cleft stick is used in agricultural operations. Bread fruit grows sparingly, and in general the fauna is more varied than in the Paumotus.

The natives are smaller and of slighter build than those of the Ellice Islands, and their color is somewhat darker and the hair generally straighter and coarser. The men wear a pandanus-leaf mat reaching to below the knees, and the women are clothed in skirts of stripped leaves, which form a very scant covering. As a rule, they are a wild-eyed people, especially the women, and formerly they were fierce and warlike, completely clothing themselves for battle in armor made of closely woven cocoanut-fiber sennet. They are still under the



government of native chiefs, but under the protection of Great Britain. There are white and Chinese traders on a number of the islands, and at Butaritari there is a little colony of whites, mostly Germans.

Between Taritari and Jaluit soundings were made at intervals of about 50 miles, which indicated a remarkable uniformity of depth of between 2,411 and 2,505 fathoms, and at a point 5 miles off the south point of Jaluit atoll 1,937 fathoms was found. Jaluit was reached on January 9, and after a stay of five days, spent in coaling, the expedition left for a cruise through the Marshall Archipelago, the course being through the Ralick chain as far as Rongelab and thence back to Jaluit via the Ratack chain. The following atolls were visited in order: Jaluit, Elmore, Namu, Kwajalong, Rongelab, Likieb, Wotje, and Arhno, stops being made at the last four and at Jaluit.

Twenty-six soundings were made during the exploration of the Marshalls, which indicate that the islands rise rather abruptly from a depth of 2,000 to 2,600 fathoms. A depth somewhat less is found between some of the atolls, but in general the soundings do not indicate the existence of the two extended ridges from which the Ratack and Ralick chains have been supposed to arise. The Marshall Islands are nearly all atolls of considerable size, Kwajalong having a length of about 65 miles, and all of the others visited except Arhno being 30 miles or more on their longest diameter. With hardly an exception their rims are composed principally of reefs awash or but slightly submerged, making them dangerous objects to approach at night or in heavy rains. The islets on the reefs are almost invariably small and in some cases are ranged in a double series, one near the outer and the other near the inner edges of the reef. The studies of the Marshalls, Gilberts, and Ellice islands on the one hand and of the Paumotus on the other supplemented one another in a very satisfactory manner, the former furnishing data concerning the action of the formative agencies producing the several varieties of land masses and the latter exhibiting the characters of the substructure upon which the islets rest. The dynamic studies in the Marshalls and Gilberts are doubtless of general application, but the character of the underlying formations in these groups can not be predicated from the knowledge gained in the Paumotus. The Carolines may in a measure serve as a guide, but the differences between the Society and Paumotus islands, which are even more intimately associated geographically than are the Carolines and Marshalls, induce caution in drawing conclusions based on relations of propinquity.

There are ship passes and anchorages in most of the lagoons, but as they are more or less studded with coral patches it is dangerous to enter them except in bright weather. The *Albatross* was detained over three days at Arhno Atoll on account of heavy rains and overcast skies, which made crossing the lagoon hazardous. Considerable rain was met with in the Marshalls, which appear to have a moister climate than most of the low islands.



The vessel returned to Jaluit on January 29, and a week was spent in coaling and overhauling the machinery. During this and the previous visit the naval officers of the expedition were engaged in making magnetic and astronomical observations and in a survey of that part of the atoll in the vicinity of the anchorage and Southeast Pass. Opportunities for doing such work were few during the cruise, but whenever a chance presented itself it was embraced with enthusiasm. A collection of corals and other biological materials was made at Jaluit and Arhno, but as usual the reef collecting was not prolific, and neither trawl hauls nor tow-net collections were made in this part of the cruise nor afterwards. From the time the ship entered the Paumotus until she left the Carolines specimens were taken by means of the submerged electric light and scoop net whenever she came to anchor in the lagoons or lay to off the islands at night. In the aggregate a good many specimens were taken in this way, and they represent practically the entire pelagic catch after leaving Suva, but being almost invariably taken in the lagoons or close to shore, the proportion of larvæ and immature individuals of reef-dwelling animals is very large. Judging from the appearance of the water and the specimens taken in the scoop net, the pelagic life of the waters west of the Marshalls is richer than among the eastern islands of the Pacific, where more pelagic work was done.

The flora of the Marshall Islands, like that of all atolls, is limited, about equal in richness to that of the Gilberts, but excelling the Paumotus. At Jaluit the white residents have imported several species from the Carolines, but most of them can be made to grow only with difficulty. There are a few bananas, pineapples, limes, and other plants, some of them set out in soil imported for the purpose from the volcanic islands to the westward, and one or two small gardens of European vegetables have been painfully established in the same way. It is almost pathetic to see the struggles of some of the Europeans to surround themselves with the familiar things of their far-away homes and to supply a few vegetables to break the monotony of the diet to which they are necessarily restricted by residence on an atoll.

The breadfruit flourishes better in the Marshalls than in the low islands of the southern groups, and the jack fruit is also common. The natives subsist principally on the cocoanut, the fruit of the pandanus, and fish, although the breadfruit and jack fruit are used to some extent where they have been introduced and taro is grown on some of the islands. Arrowroot starch in cocoanut shells was seen at one or two of the islands, but the pia plant, from which it is obtained, was not observed, and the product may have been imported. During the season when the pandanus is ripe it appears to be almost the sole vegetable food, and piles of the woody portion of the fruit are seen in the refuse heaps of every domicile. It is eaten raw, when it has a sweet taste something like sugar cane, and is also scraped and made into large sheets or cakes, which are smoked and dried for

preservation. As in all of the low islands, the kernel of the cocoanut is eaten, and the oil expressed from the grated meat is used in the compounding of the few "made dishes" affected by the natives.

The Marshall islanders exhibit much skill in canoe building and navigation. The canoes were formerly made of driftwood, as most of the islands did not furnish trees of sufficient size or suitable structure, but material derived from the whites is now used to some extent. The sailing canoes are often of considerable size, and are made of a number of pieces sewed together with cocoanut fiber sennit and calked with pandanus leaves, cocoanut fiber, and the gum of the breadfruit or jack trees. The hull is skillfully designed, and with the large triangular mat sails trimmed close they point up well and are quite speedy. Like all South Sea canoes, they are provided with outriggers, always kept to windward. These islanders also used a chart made of sticks and small shells, indicating the positions of the islands and the currents. They are said to be quite expert in navigating their canoes from island to island by means of these charts, but are sometimes not as successful with the white man's sloop, which is coming more and more into use by the natives, especially the chiefs.

The women are adepts at mat making and often show considerable taste in the border designs, which are worked in black, brown, and yellow, in contrast to the white body color. The material used is prepared pandanus leaves, with another fiber for some of the stitching, and the dyestuffs are of native production. These mats are worn as clothing, the women using two, held at the waist by a girdle to form a sort of skirt, and the men wearing one as a breechcloth. The men also, with ludicrous effect, occasionally wear a pair of garments made of strips of pandanus leaves, one being thrust beneath the girdle in front and the other behind, so that they hang over like a pair of horsetails, reaching to about the knees.

At Jaluit and some other islands the natives, especially the chiefs and their families, dress in clothing fashioned after that of the whites, and at one island the men wear calico petticoats in lieu of trousers.

The Marshall islanders appear to be slightly larger in stature than the Gilbert islanders and with somewhat heavier frames. Their color is also darker, although in this respect our observations do not agree with some of the published statements concerning them. They are less hospitable than the Fijians and Maoris, but everywhere exhibited a friendly disposition. There is much sickness among the islands, usually of a type introduced by the whites, and the German Government has established a hospital at Jaluit, where the natives receive excellent treatment.

During both visits of the *Albatross* to Jaluit, which is the seat of the German government of the Marshall Islands and the headquarters of the several trading companies, the members of the expedition met with the kindest and most hospitable treatment from the Herr Landeshauptmann, his officers, and the white residents.

Jaluit was left on February 5 by way of the Southwest Pass, which has deep water, but is skirted on the lagoon side by a long fringe of reefs. Namorik was passed in the night, and on the afternoon of February 7 the *Albatross* reached Kusaie, the first of the Caroline Islands. A boisterous sea was encountered in this part of the cruise which not only prevented sounding, but made it inexpedient to enter Chabral Harbor, as contemplated, its mouth being open to the full force of the trade winds, and it was nightfall when the ship came to anchor in Port Lottin, the approaches to which were in smoother water. The room in this harbor is circumscribed and the published plan is inaccurate, and a hurried survey was made by the officers of the vessel during the day and a half spent there.

Kusaie, which is 10 or 12 miles in diameter, is a high volcanic island, with its central peak, Mount Crozer, rising to a height of 2,155 feet, and several others almost equaling it in altitude. The shores are largely formed of mangrove swamps traversed by a network of confluent channels and bayous, in which respect it resembles the delta regions of Viti Levu and some of the other large islands of the Fijis, and differs from the Society Islands, where the mangrove was not seen anywhere. Many of the streams of Kusaie have no definite mouths, but in their lower courses become lost in the mangrove swamps. The entire coast of the island is fringed by reefs lying outside of the mangrove swamps and interrupted in but three places by harbor mouths, and, by using the bayous and the shallow channels back of the reefs, canoes can travel around considerable parts of the coast in smooth water, even when a heavy sea is running outside.

The vegetation of Kusaie is dense and varied. Here the vegetable ivory tree, the most majestic of the South Sea palms, was first met with by the expedition. Its fruit is an article of commerce, being utilized in the production of articles for which ivory was formerly used. Fruits and vegetables and some excellent beef were obtained here for the use of the ship.

On February 10, the day following her departure from Kusaie, the *Albatross* reached Pingelap, where she lay to without sending a party ashore. Pingelap is an atoll of irregular shape and hardly 3 miles in diameter. There are three islands on the reef, between which fierce war was formerly waged until one gained the ascendancy and brought all under its rule, since which the population has increased so rapidly that the people can barely support themselves upon the scanty yield of the soil and the fisheries, their only resources. A party of natives, including the chief, who came off to the ship, stated that although the people are all professed Christians, the missionary vessel never calls there, and they are left to the religious ministrations of a native.

Ponape, the capital island of the former Spanish administration of the Carolines, was reached on February 11, and a stop of less than a day was made at Kiti Harbor, on the south side, Jakoits, the northern port and seat of government, not being visited. The inner harbor has

good water and bottom, but the approach through the narrows is much restricted by coral reefs on each side, and as the stay of the *Albatross* was to be brief she anchored in the outer harbor, the entrance to which is easy. Ponape closely resembles Kusaie in its general characters, but is somewhat larger, having a diameter of about 15 miles, with a central peak rising to an altitude approaching 2,900 feet. The reef platform surrounding the island is, however, much broader than at Kusaie, being upward of 2 miles across at Kiti Harbor and much wider on the north shore. There are a number of islands on the reef, some of them of volcanic origin, probably detached portions of the main island, while others, for example those near Kiti Harbor, are, like the islets of typical atolls, composed of reworked coral sand and fragments from the reefs. Behind the sandy islets, which are mostly on the edge of the reef and near the harbor mouths, there is, at least to the eastward of Kiti Harbor, a channel with some depth.

A small river, about 100 feet wide at its mouth and several feet deep, flows into the head of Kiti Harbor, but the entrance to it is so obstructed by a bar that the boats could only enter it with ease near high water. It contains many small fish, though apparently of but few species, and its banks support a rich vegetation. There are several white men at Kiti Harbor and some small plantations of bananas and other fruit trees. The breadfruit, jacktree, and vegetable ivory palm all attain a large size, and the royal poinciana, with its scarlet blossoms on otherwise almost naked branches, was found in abundance.

The last stop made by the *Albatross* in the Caroline Archipelago was at Moen or Uala Island, in the Truk group, which was reached on February 14 and left on February 17. The Truk group consists of about a score of volcanic islands and islets surrounded by a barrier reef, with a diameter of about 70 miles, and supporting numerous low, sandy islets having the appearance, as viewed from the ship, of the islands usually found on atoll rims. The northern part of the reef is said to be much broader than the southern, where it varies from about one-third to one-half mile in width, with many interruptions. The high islands, which are volcanic in formation, vary from 12 miles in length to inconsiderable islets, several of them possessing peaks 1,200 or 1,300 feet high. Each of these islands is surrounded by a narrow fringe of reef, and in fact the group as a whole looks like an exaggeration of the conditions observed at Kusaie and Ponape, the lagoon being merely the reef channel of those islands enormously widened and considerably deepened and surrounding a group of smaller islands instead of one large one.

In addition to the islands at which stops were made, the islands of Andema, Namu, Losap, the Royalist group, and Namonuito were coasted, and their general characters observed from the ship.

The land fauna of the Carolines is much richer in proportion to the land area than in any of the other islands visited by the *Albatross*. In the Ellice, Gilbert, and Marshall islands land birds are extremely

uncommon and of but few species, the avi-fauna being poorer than in the Paumotus. The Society and Fiji islands are progressively richer, but it was not until the Carolines were reached that the woods and thickets seemed full of birds and resounded with their songs and cries. Parrots and pigeons of several species, white-eyes, flycatchers, kingfishers, and many other species were observed at Kusaie, Ponape, and Truk, and the collections, which, in spite of effort, had languished for lack of material after leaving Suva, began to offer some returns to the shooters notwithstanding the brevity of the opportunities, which made it impossible to secure a really representative collection. Two species of herons, seen nowhere else, resembling one another more or less in color, but differing greatly in size, were taken at Ponape.

Four species of bats, three of which are represented in the collections, were observed in the Carolines. Three of them belong to the Frugivora, while the fourth is insectivorous, the only species of its kind observed except at Viti Levu. The fruit bats appear to subsist mainly on the flowers of the poinciana, and especially on the island of Ponape must exist in large numbers, as from one to twenty were seen in almost every tree of that species. Several species of lizards were collected, and it is probable that careful collecting in all parts of the islands would show a much more extensive reptilian fauna than that observed in the eastern islands of the Pacific.

The natives of the several Caroline islands visited differ more or less in appearance and present customs and social conditions. In Kusaie and Ponape they have been brought into more intimate contact with the whites, from whom they have copied their clothing and in a measure their houses. The women wear long loose gowns or "mother hubbards," and the men usually dress in the shirts and trousers—the former, in regulation tropical style, worn outside—and most of them have hats. In Truk, however, this dress, although occasionally seen, is rare, the men wearing a breechcloth reduced to the utmost limit and the women a cincture or loin cloth of cocoanut fiber reaching to the knees. The upper part of the body is usually naked, but is covered on occasion by a sort of poncho, a straight strip of cloth about 6 feet long, with a slit in the middle through which the head is thrust.

The people of Truk, especially the men, are much given to personal adornment. The face is heavily powdered with turmeric, the hair is worn in a high knot on the crown of the head and bound with strips of bright cloth, necklaces of various materials are worn in profusion, and from the pierced and extravagantly stretched lobes of the ears depend looped chains of cocoanut-shell rings, which are often 4 or 5 feet long and form a bunch 6 inches long and 2 inches in diameter.

The natives of Truk are taller and more slender than the people of Kusaie and Ponape. The men are well formed and athletic looking, but with somewhat effeminate faces, owing in a measure to their lavish adornment and the manner of wearing the hair. The younger women are often comely and both sexes are more yellow than the Kusaie



and Ponape people, an effect which is heightened by the profuse application of turmeric to their complexions.

At Kusaie the houses which appear to represent most nearly the native type are built of half-round sticks lashed horizontally to a framework and are thatched with cocoanut leaves. Some of them are elevated on platforms, provided with porches, and divided into rooms, but there is reason to believe that all of these features, excepting perhaps the first, are copied from the whites. At Moen Island in the Truk group the houses are larger, with the ends open or closed by a sort of shed leaning against the main structure. Several families, or the married members of the same family, reside under the one roof, a row of small compartments for their occupancy stretching along each side of the house, leaving a broad central aisle, or hall, which is used as a general living room, workshop, and storehouse. Canoes are housed and sometimes built in the main hall, and the various household utensils and fishing appliances are stored there.

The women of some of the Carolines—e. g., Kusaie and Truk—weave a coarse cloth from the fibers of the banana, which is spun into a thread by rolling several fibers together upon the naked thigh and knotting the lengths into a continuous piece. In Kusaie the warp is laid up on small ornamented benches with pins, and at Truk the same purpose is attained by laying the thread around pins driven into the ground in proper relationships of distance and position. The hand looms are of simple type, alike at the two islands mentioned, but much larger at Truk. The cloth is still extensively used for clothing at Truk, but not so much at Kusaie.

The people of Kusaie and Ponape are mild, peaceable, and friendly, but those at Truk still engage in tribal wars and are said to be warlike and treacherous, a reputation which the members of the expedition believe to be justified. They still fight with spears, but many of them are provided with good firearms.

Six soundings were made, one near Namu Island, where 525 fathoms was found; another about three-quarters of a mile south of Port Lotton, Kusaie, where the depth was 371 fathoms, and four others at places removed from insular influence, which show apparently that the islands of the archipelago rise rather abruptly from a depth of upward of 2,000 fathoms, the extremes being 2,162 and 2,533 fathoms. After leaving the Carolines the soundings gradually deepened until, in latitude  $12^{\circ} 51' N.$ , longitude  $145^{\circ} 46' E.$ , about 100 miles southeast of Guam, 4,813 fathoms was found, but in latitude  $13^{\circ} 08' N.$ , longitude  $145^{\circ} 25' E.$ , approaching the Ladrões, the depth had decreased to 2,337. A few months before, as was learned at Guam, the U. S. S. *Nero*, while sounding out a cable route, had found over 5,000 fathoms somewhere near the same place, and the *Challenger*, during her famous cruise around the world, made a sounding of 4,475 fathoms farther to the westward, but evidently in the same basin, which is established as one of the deepest holes in the world, almost equaling in depth the great Tonga Deep.

Guam was sighted the morning of the 21st of February, and after coasting the eastern, northern, and part of the western shores the ship came to anchor in the harbor of San Luis d'Apra. The coast of the northern part of the island resembles that of Makatea and Niue, with limestone cliffs in places several hundred feet in height, but the southern part is volcanic, and near Agaña contacts were found which indicated that the igneous rocks had burst through the preexisting limestone, though there is reason to believe that some of the elevated calcareous rocks farther south are more recent than the igneous rocks with which they are in contact. The northern part of the island is flat-topped, although considerably eroded, while the southern half is rolling and hilly.

The harbor of San Luis d'Apra is well sheltered, in part by high land and in part by a long stretch of reef with a narrow opening, and since the occupation of the island by the United States it has been thoroughly surveyed by the naval officers stationed there. There is only a small village at the harbor, but a good road leads to the populous town of Agaña, the capital, several miles distant, and a telephone line now connects the two places. Agaña lies on the seacoast, but a reef with but very shallow passes makes it useless as a harbor, except for very small craft. It is built partly in the Spanish style, partly native, and partly a mixture of the two, and under the energetic administration of Governor Leary many of its unsanitary features have been corrected and it presents a clean and orderly appearance. Its principal buildings are the palace and the offices of administration, the barracks, and the hospital, all built by the Spaniards, and which either face or immediately adjoin the parade or plaza in the center of the town. The population is said to number over 6,000.

The island is about 27 miles long and 7 or 8 miles wide, and its general topography has already been indicated. It has a moist climate, not excessively hot, and is fairly well watered; the streams, however, are small and are said to be shrinking as a result of cultivation and the clearing of the forests. Oranges, shaddocks, limes, bananas, bread-fruit, and all the tropical fruits are found, and corn, rice, sugar, tobacco, sweet-potatoes, and other imported plants are cultivated.

The population is a mixed one, consisting of the natives or Chamorros, with a few Filipinos and Caroline Islanders, and a mixture of the first two with Spanish blood. The Americans complain of the extreme indolence of the native population, a characteristic which their Spanish predecessors appear to have recognized, as they imported natives of the Carolines for labor on some of the public works. A small village of Caroline Islanders near Agaña, left stranded by a contractor who had imported them, still maintains in a measure the Caroline manner of living. Most of the people speak Spanish, but some are endeavoring to learn English since the cession of the island to the United States.

The *Albatross* left Guam on February 25, and after coasting Rota,

a high limestone island, laid a course for Yokohama, Japan. The only other island of the long Ladrone chain sighted was the northernmost, Farallon de Pajaros, an active volcano, with an elevation of over 1,000 feet, which, from a distance of 25 miles to the westward, appeared to have steam and smoke issuing from several vents. At its southern end there is a smaller, less lofty portion, either detached or with a low connection with the main island.

On March 4 the *Albatross* came to anchor outside of the breakwater at Yokohama, but she afterwards moved into the inner harbor. Until May she was refitting, repairing engines, and in dry dock at Uraga, but early in that month she proceeded on a dredging expedition in the direction of the Inland Sea. About 70 dredge, trawl, and tangle hauls were made in Sagami and Suruga bays, and the Sea of Ise and adjoining parts of the coast. The work was practically all inside of the 100-fathom line and on the edge of the Kurosiwa or Black Current, the great warm stream which flows from the south along the east coast of Japan and sweeps northward along the Kurils and the Aleutian Chain, where it becomes the great North Pacific Drift. This great stream bears much the same relation to the shores of Asia that the Gulf Stream bears to the east coast of North America, and in the same manner its warm waters bear a rich pelagic fauna, furnishing food and a congenial environment to the host of animals which live on the bottom. The trawling was very good, and rich collections of fish, crustaceans, worms, echinoderms, and mollusca were obtained. Two large tanks were filled with specimens of *Metacrinus*, a "stone lily," formerly rare, and stalkless crinoids of several species were obtained in large numbers. The Alcyonarian fauna is rich and varied and a considerable collection of these beautiful organisms was obtained, and a number of siliceous sponges, including half a score of the beautiful glass-like Venus' flower basket (*Euplectella*), were taken in the trawls. For taking these delicate organisms in an uninjured condition the apparatus used by the *Albatross* is not so good as the long lines used by the Japanese fishermen, which have adventitiously yielded to science the fine collection of sponges in the Imperial University of Tokyo.

The crustacean fauna of the edge of the Black Current and the coastal slopes of Japan is especially rich in the suborders Macrura and Brachyura, to which the shrimps and the hermit crabs, spider crabs, etc., respectively, belong.

After finishing the dredging operations the *Albatross* returned to Yokohama, where she coaled and sailed for Hakodate on June 1. Several trawl hauls were made en route to the latter port and a short and unsuccessful search was made for a reported dangerous rock off Kinkwazan. The ship was much delayed by fogs and reached Hakodate on June 8. After coaling she sailed June 12 for Alaska, where she was at the end of the fiscal year.



# REPORT OF THE DIVISION OF STATISTICS AND METHODS OF THE FISHERIES.

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BY C. H. TOWNSEND, *Assistant in Charge.*

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At the commencement of the present fiscal year, most of the statistical field agents of the division were engaged in canvassing the fisheries of the New England States. Maine was canvassed by Mr. John N. Cobb; New Hampshire by Messrs. W. A. Wilcox and T. M. Cogswell; Massachusetts by Messrs. Wilcox, Cogswell, and Ansley Hall; Rhode Island by Mr. E. S. King, and New York and Connecticut by Mr. C. H. Stevenson. At the same time Mr. W. A. Roberts was engaged in statistical work in New Jersey, and Mr. John B. Wilson was temporarily engaged in canvassing the wholesale fishery trade of Boston. Upon the completion of the work in the fall, all of these persons were employed in the arrangement of the data collected and in other necessary office work.

Mr. C. H. Townsend, assistant in charge, after a brief visit early in July to certain fishery centers of the New England States in company with the statistical agents, returned to the office. In August he was, on account of previous experience in deep-sea investigations, detailed as a member of the scientific staff to assist Prof. Alexander Agassiz on board the steamer *Albatross*, then starting upon a voyage of deep-sea exploration through the South Pacific Ocean. Mr. Townsend accompanied the expedition as far as the Fiji Islands, from which point he returned to Washington. Arriving there in January, he remained in charge of the office until near the close of the fiscal year.

In October Mr. Stevenson began work in North Carolina in connection with the steamer *Fish Hawk*, then engaged in investigations respecting the oyster-grounds of that State. His inquiries were in large part prosecuted on shore, and were continued, with some interruptions, until March.

In December Mr. Cobb commenced a canvass of the fisheries of Lake Erie, the work being completed in February.

Mr. Wilcox left in May for the Columbia River to commence a canvass of the fisheries of the Pacific coast. The fisheries of Oregon and Washington were taken up first, in order that the extensive salmon fisheries of the Northwest coast might be studied while the canneries were in operation. The work is still in progress.



Capt. S. J. Martin and Mr. F. F. Dimick, local statistical agents of the division stationed at Gloucester and Boston, continue to submit monthly reports on the fisheries at those places. The information is tabulated in the office and distributed regularly to the fishery trade in the New England States.

The results of the work of this division are presented elsewhere from year to year in the publications of the Commission as detailed statistical reports on the commercial fisheries of different sections of the country, or special papers on the methods of conducting the fisheries.

Single-sheet bulletins containing advance statistics in condensed form are distributed for the information of the fishery trade in the regions to which they refer. The following have been issued during the year:

No. 13. Fisheries of New York and New Jersey, 1898.

No. 14. Statement of quantities and values of certain fishery products landed at Boston and Gloucester by American vessels during the year 1899.

No. 15. Fisheries of the New England States, 1898.

No. 16. Fisheries of Lake Erie, 1899.

#### FISHERIES OF LAKE ERIE.

An inquiry respecting the commercial fisheries of Lake Erie in 1899 shows an important increase in the yield of these fisheries since they were last canvassed. This applies not only to the quantity of products, but also to their value, the amount of capital invested, and the number of persons employed. Decided increases are shown in the yield of white-fish and lake herring. The yield of pike perch continues to be large, although it has not increased over that of former years. These species are extensively propagated artificially, and it is believed that their cultivation is producing excellent results. In 1899 the fisheries of this lake yielded 58,393,364 pounds of products, valued at \$1,150,890. The total number of persons engaged was 3,728, and the investment amounted to \$2,719,654.

The vessels employed numbered 104 and were valued, with their outfits, at \$439,077. The apparatus of capture which represented the greatest value was pound nets, of which 1,298 were in use, valued at \$313,125. Gill nets are next in importance, 41,678 being in use, and valued at \$229,182.

Among the products herring are preeminent, 33,470,633 pounds having been taken, worth \$431,894. The catch of pike and pike perch was 9,325,991 pounds, valued at \$302,296. White-fish was taken to the amount of 2,066,314 pounds, worth \$152,009. It is interesting to note that carp, now abundant in this lake, are extensively utilized, the catch amounting to 3,633,697 pounds, worth \$51,456.

The two following tables show the persons, apparatus, and capital employed in the fisheries of Lake Erie in 1899, and the quantities and values of the different species obtained in the fisheries of the lake in that year.

Table showing the persons, apparatus, and capital employed in the fisheries of Lake Erie in 1899.

| Items.                             | New York. |          | Pennsyl-<br>vania. |          | Ohio.  |           | Michigan. |          | Total. |           |
|------------------------------------|-----------|----------|--------------------|----------|--------|-----------|-----------|----------|--------|-----------|
|                                    | No.       | Value.   | No.                | Value.   | No.    | Value.    | No.       | Value.   | No.    | Value.    |
| Persons employed:                  |           |          |                    |          |        |           |           |          |        |           |
| Vessel fishermen                   | 55        |          | 156                |          | 363    |           |           |          | 574    |           |
| Transporters and shores-<br>men    | 104       |          | 102                |          | 537    |           | 10        |          | 753    |           |
| Boat fishermen                     | 817       |          | 206                |          | 1,268  |           | 110       |          | 2,401  |           |
| Vessels, apparatus, etc.:          |           |          |                    |          |        |           |           |          |        |           |
| Steamers fishing                   | 10        | \$34,000 | 25                 | \$60,200 | 50     | \$187,200 |           |          | 85     | \$281,400 |
| Tonnage                            | 167       |          | 284                |          | 796    |           |           |          | 1,247  |           |
| Outfit                             |           | 7,070    |                    | 20,235   |        | 36,266    |           |          |        | 63,571    |
| Steamers transporting              |           |          | 1                  | 1,000    | 16     | 63,500    | 2         | \$10,200 | 19     | 74,700    |
| Tonnage                            |           |          | 16                 |          | 351    |           | 51        |          | 418    |           |
| Outfit                             |           |          |                    | 400      |        | 15,790    |           | 3,216    |        | 19,406    |
| Boats                              | 134       | 9,955    | 49                 | 8,055    | 630    | 57,797    | 63        | 3,659    | 876    | 79,466    |
| Pile-drivers                       |           |          | 10                 | 1,155    | 48     | 22,705    | 11        | 2,190    | 69     | 26,050    |
| Seines                             | 4         | 400      |                    |          | 92     | 7,425     | 8         | 565      | 104    | 8,390     |
| Gill nets                          | 6,279     | 39,168   | 11,364             | 66,092   | 24,035 | 123,922   |           |          | 41,678 | 229,182   |
| Pound nets                         |           |          | 50                 | 19,900   | 988    | 259,475   | 260       | 33,750   | 1,298  | 313,125   |
| Trap nets                          | 24        | 1,035    | 102                | 3,710    | 257    | 10,400    | 43        | 1,230    | 426    | 16,375    |
| Fyke nets                          |           |          |                    |          | 555    | 15,130    | 62        | 620      | 617    | 15,750    |
| Lines, etc.                        |           | 2,620    |                    | 90       |        | 902       |           |          |        | 3,612     |
| Shore property and cash<br>capital |           | 227,145  |                    | 275,265  |        | 1,071,110 |           | 15,107   |        | 1,588,627 |
| Total investment                   |           | 321,393  |                    | 456,102  |        | 1,871,622 |           | 70,537   |        | 2,719,654 |

Summary of the quantities and values of the species of fishes obtained in the fisheries of Lake Erie in 1899.

| Species.               | New York. |         | Pennsylvania. |         | Ohio.      |         | Michigan. |        | Total.     |           |
|------------------------|-----------|---------|---------------|---------|------------|---------|-----------|--------|------------|-----------|
|                        | Lbs.      | Value.  | Lbs.          | Value.  | Lbs.       | Value.  | Lbs.      | Value. | Lbs.       | Value.    |
| Black bass             | 10,579    | \$822   | 38,299        | \$3,031 | 83,714     | \$5,933 | 1,154     | \$80   | 133,746    | \$9,866   |
| Carp                   | 9,505     | 190     | 12,195        | 244     | 3,417,094  | 47,176  | 194,903   | 3,846  | 3,633,697  | 51,456    |
| Cat-fish               | 136,243   | 4,087   | 100,727       | 3,022   | 704,029    | 21,503  | 61,705    | 1,839  | 1,002,704  | 30,451    |
| Crappie                |           |         | 60,000        | 1,800   |            |         |           |        | 60,000     | 1,800     |
| Herring                | 3,321,558 | 43,554  | 10,742,315    | 134,142 | 19,389,822 | 253,669 | 17,938    | 539    | 33,471,633 | 431,904   |
| Perch                  | 257,932   | 4,391   | 815,553       | 16,911  | 2,174,564  | 30,310  | 67,447    | 1,013  | 3,315,496  | 52,625    |
| Rock bass              |           |         |               |         | 5,296      | 91      |           |        | 5,296      | 91        |
| Sheepshead             | 10,130    | 102     | 57,993        | 580     | 1,043,818  | 6,792   | 35,181    | 177    | 1,147,122  | 7,651     |
| Sturgeon               | 627,433   | 40,997  | 99,570        | 7,090   | 50,094     | 4,519   | 12,305    | 786    | 789,402    | 53,392    |
| Sucker                 | 93,370    | 1,068   | 120,245       | 1,339   | 1,171,782  | 12,920  | 183,337   | 2,750  | 1,568,734  | 18,077    |
| Sun-fish               |           |         | 125,000       | 3,750   | 36,800     | 407     | 13,640    | 205    | 175,440    | 4,362     |
| Trout                  | 29,242    | 1,510   | 722           | 61      | 2,060      | 165     |           |        | 32,024     | 1,736     |
| Pike and pike<br>perch | 840,244   | 32,369  | 1,609,940     | 48,575  | 6,371,497  | 194,993 | 504,310   | 26,359 | 9,325,991  | 302,296   |
| White bass             | 45,432    | 908     | 454,434       | 8,639   | 1,055,951  | 20,046  | 40,707    | 1,010  | 1,596,524  | 30,603    |
| White-fish             | 172,456   | 10,907  | 615,821       | 46,690  | 1,049,578  | 76,276  | 228,459   | 18,136 | 2,066,314  | 152,009   |
| Other fish             | 200       | 14      | 190           | 13      | 108        | 9       | 550       | 39     | 1,048      | 75        |
| Frogs                  |           |         |               |         | 982        | 172     |           |        | 982        | 172       |
| Turtles                |           |         |               |         | 67,211     | 2,324   |           |        | 67,211     | 2,324     |
| Total                  | 5,554,324 | 140,919 | 14,853,004    | 275,887 | 36,624,400 | 677,305 | 1,361,636 | 56,779 | 58,393,364 | 1,150,890 |

For purposes of comparison the following table is given, showing the yield and value of the fisheries of Lake Erie in former years:

| Species.      | 1880.      |           | 1885.      |             | 1890.      |             | 1893.      |           | 1897 (fis-<br>cal year). |
|---------------|------------|-----------|------------|-------------|------------|-------------|------------|-----------|--------------------------|
|               | Lbs.       | Value.    | Lbs.       | Value.      | Lbs.       | Value.      | Lbs.       | Value.    | Lbs.                     |
| All varieties | 29,087,300 | \$474,880 | 51,456,517 | \$1,109,096 | 64,850,873 | \$1,000,905 | 42,968,325 | \$805,979 | (*)                      |
| White-fish    | 3,333,800  |           | 3,531,855  |             | 2,341,451  |             | 1,292,410  |           | 689,906                  |
| Herring       | 11,774,400 |           | 19,354,900 |             | 38,868,283 |             | 20,931,076 |           | 19,638,289               |

\* Information on all species not obtained.

FISHERIES OF LAKE ONTARIO.

The commercial fisheries of this lake, after several years of decrease, now show a gratifying increase, the products being, in quantity and value, nearly three times as great as in 1897, the year when last investigated. The same increase is shown in the amount of capital invested, and the number of persons employed is much greater. Fish-cultural operations here are apparently giving good results, the plantings of white-fish and pike perch having been noticeably beneficial.

The total number of persons engaged in the commercial fisheries in 1899 was 391. The capital invested amounted to \$80,350. The fisheries yielded 2,407,132 pounds of products, worth \$101,130.

Among the products cat-fish are prominent in quantity and value, 518,423 pounds, worth \$18,834, being taken. The yield of perch was 407,017 pounds, valued at \$11,822. The catch of sturgeon was 189,955 pounds, worth \$17,843. Pike and pike perch, 297,801 pounds, were worth \$16,127, and white-fish, 161,935 pounds, were worth \$10,978.

The figures for Lake Ontario include, however, the fisheries of the St. Lawrence and Niagara rivers. In the St. Lawrence 69 fishermen obtained 81,900 pounds of products in 1899, valued at \$6,988; in the Niagara River 7 fishermen procured 13,170 pounds, worth \$484.

Table showing the persons employed in the fisheries of Lake Ontario in 1899.

| How engaged.                  | No. |
|-------------------------------|-----|
| On vessels transporting ..... | 5   |
| In shore fisheries .....      | 373 |
| Shoresmen .....               | 13  |
| Total .....                   | 391 |

Vessels, apparatus, and capital employed in the Lake Ontario fisheries in 1899.

| Items.                    | No.   | Value.  | Items.                          | No. | Value. |
|---------------------------|-------|---------|---------------------------------|-----|--------|
| Vessels transporting..... | 2     | \$1,000 | Apparatus—Continued.            |     |        |
| Tonnage .....             | 22    | 90      | Dip nets .....                  | 4   | \$20   |
| Outfit .....              |       |         | Set and hand lines .....        |     | 1,355  |
| Boats .....               | 287   | 8,482   | Spears .....                    | 9   | 7      |
| Apparatus:                |       |         | Fishing machines .....          | 4   | 400    |
| Seines .....              | 24    | 420     | Shore and accessory property .. |     | 18,440 |
| Gill nets .....           | 1,187 | 18,674  | Cash capital .....              |     | 20,200 |
| Pound nets .....          | 1     | 60      |                                 |     |        |
| Trap nets .....           | 144   | 5,790   | Total .....                     |     | 80,350 |
| Fyke nets .....           | 451   | 5,412   |                                 |     |        |

Table showing the species and yield of the fisheries of Lake Ontario in 1899.

| Products.                 | Lbs.    | Value.  | Products.                 | Lbs.      | Value.  |
|---------------------------|---------|---------|---------------------------|-----------|---------|
| Black bass .....          | 48,046  | \$3,133 | Sucker .....              | 278,738   | \$5,101 |
| Cat-fish .....            | 518,423 | 18,834  | Sun-fish .....            | 148,449   | 2,099   |
| Carp .....                | 1,000   | 50      | Trout .....               | 15,432    | 853     |
| Eels .....                | 123,840 | 6,163   | Pike and pike perch ..... | 297,801   | 16,127  |
| Herring .....             | 85,478  | 3,736   | White bass .....          | 2,300     | 92      |
| Long-jaw or bloater ..... | 1,300   | 77      | White-fish .....          | 161,935   | 10,978  |
| Minnows .....             | 22,700  | 1,593   | Frogs .....               | 1,750     | 306     |
| Perch, yellow .....       | 407,017 | 11,822  |                           |           |         |
| Sturgeon .....            | 189,955 | 17,843  | Total .....               | 2,407,132 | 101,130 |
| Rock bass .....           | 102,968 | 2,323   |                           |           |         |

## FISHERIES OF BOSTON AND GLOUCESTER.

The reports of the agents of the Commission stationed at these ports show a large increase in the quantity and value of fishery products landed during the year. The figures for 1899, as compared with those of the previous year, exhibit an increase of 33,370,561 pounds, valued at \$1,204,564. The total quantity of products landed by American vessels was 176,774,301 pounds, worth \$4,193,652. The total number of fares was 7,820.

At Boston there has been a slight increase in the total quantity and value of products as compared with 1898. This is shown both in the supply derived from the eastern banks and from fishing-grounds off the New England coast. There has been an increase in the quantity of both fresh and salted fish and in the value of fresh fish, with a small decrease in the value of salted fish. The increase in the quantity of fresh fish landed was 9,956,659 pounds and \$390,831 in value. In the salted fish the increase amounted to 88,500 pounds, with a decrease in value of \$4,125. The total increase in fresh and salted fish amounted to 10,045,159 pounds, and \$386,706 in value.

The total quantity of products landed at Boston was 64,724,729 pounds, valued at \$1,428,346. The number of fares was 3,866, of which 183 were from the eastern banks and 3,683 from grounds off the New England coast. The fresh and salted fish from the eastern banks amounted to 9,908,910 pounds, valued at \$246,206, and from grounds off the New England coast to 54,815,819 pounds, valued at \$1,182,140.

*Summary, by fishing-grounds, of certain fishery products landed at Boston, Mass., in 1899 by American fishing vessels.*

| Fishing-grounds.          | No. of trips. | Cod, fresh. |          | Cod, salted. |         | Cusk, fresh. |         | Haddock, fresh. |          |
|---------------------------|---------------|-------------|----------|--------------|---------|--------------|---------|-----------------|----------|
|                           |               | Lbs.        | Value.   | Lbs.         | Value.  | Lbs.         | Value.  | Lbs.            | Value.   |
| East of 66° W. long.:     |               |             |          |              |         |              |         |                 |          |
| La Have Bank.....         | 54            | 786,500     | \$18,481 | -----        | -----   | 220,000      | \$3,172 | 552,910         | \$14,107 |
| Western Bank.....         | 48            | 1,263,400   | 25,282   | 50,000       | \$1,250 | 55,000       | 637     | 170,800         | 4,674    |
| Grand Bank.....           | 3             | -----       | -----    | -----        | -----   | -----        | -----   | -----           | -----    |
| Burgeo Bank.....          | 2             | -----       | -----    | -----        | -----   | -----        | -----   | -----           | -----    |
| Bacalieu Bank.....        | 1             | -----       | -----    | -----        | -----   | -----        | -----   | -----           | -----    |
| Off Newfoundland.....     | 27            | -----       | -----    | -----        | -----   | -----        | -----   | -----           | -----    |
| Cape Shore.....           | 42            | 407,000     | 8,095    | -----        | -----   | 67,600       | 689     | 286,000         | 6,873    |
| Gulf of St. Lawrence..... | 6             | 6,000       | 90       | -----        | -----   | -----        | -----   | -----           | -----    |
| Total.....                | 183           | 2,462,900   | 51,948   | 50,000       | 1,250   | 342,600      | 4,498   | 1,009,710       | 25,654   |
| West of 66° W. long.:     |               |             |          |              |         |              |         |                 |          |
| Browns Bank.....          | 65            | 1,114,500   | 19,007   | -----        | -----   | 271,500      | 2,873   | 1,224,000       | 21,614   |
| Georges Bank.....         | 378           | 3,090,400   | 73,629   | -----        | -----   | 94,500       | 1,166   | 6,438,000       | 131,405  |
| Cashes Bank.....          | 31            | 220,000     | 4,088    | -----        | -----   | 109,000      | 1,074   | 121,700         | 3,725    |
| Clark Bank.....           | 4             | 24,500      | 500      | -----        | -----   | -----        | -----   | 120,000         | 1,750    |
| Fippenies Bank.....       | 1             | 3,000       | 75       | -----        | -----   | -----        | -----   | 1,000           | 13       |
| Middle Bank.....          | 336           | 648,400     | 16,501   | -----        | -----   | 15,800       | 186     | 1,573,800       | 37,626   |
| Jeffreys Ledge.....       | 261           | 563,200     | 14,397   | -----        | -----   | 32,200       | 453     | 1,183,500       | 30,867   |
| South Channel.....        | 552           | 4,694,300   | 104,451  | -----        | -----   | 145,500      | 1,819   | 9,115,200       | 193,050  |
| Nantucket Shoals.....     | 161           | 2,058,200   | 30,783   | -----        | -----   | -----        | -----   | 188,200         | 3,860    |
| Off Highland Light.....   | 81            | 266,100     | 6,556    | -----        | -----   | 3,000        | 39      | 450,900         | 11,464   |
| Off Chatham.....          | 87            | 353,300     | 7,706    | -----        | -----   | 15,000       | 210     | 624,300         | 15,494   |
| Shore, general.....       | 1,726         | 4,185,750   | 108,115  | -----        | -----   | 75,700       | 1,035   | 3,094,850       | 77,676   |
| Total.....                | 3,683         | 17,221,650  | 385,808  | -----        | -----   | 760,200      | 8,855   | 24,135,450      | 528,544  |
| Grand total.....          | 3,866         | 19,684,550  | 437,756  | 50,000       | 1,250   | 1,102,800    | 13,353  | 25,145,160      | 554,198  |

## 168 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Summary, by fishing-grounds, of certain fishery products landed at Boston, Mass., in 1899 by American fishing vessels—Continued.

| Fishing-grounds.           | Hake, fresh. |         | Pollock, fresh. |        | Halibut, fresh. |          |
|----------------------------|--------------|---------|-----------------|--------|-----------------|----------|
|                            | Lbs.         | Value.  | Lbs.            | Value. | Lbs.            | Value.   |
| East of 66° W. longitude:  |              |         |                 |        |                 |          |
| La Have Bank .....         | 297,000      | \$3,992 | 33,500          | \$458  | 194,400         | \$15,258 |
| Western Bank .....         | 211,600      | 2,067   | 18,000          | 173    | 341,100         | 28,459   |
| Grand Bank .....           |              |         |                 |        | 150,000         | 7,500    |
| Burgeo Bank .....          |              |         |                 |        | 115,000         | 5,750    |
| Bacal en Bank .....        |              |         |                 |        | 50,000          | 3,500    |
| Off Newfoundland .....     |              |         |                 |        | 180,000         | 10,600   |
| Cape Shore .....           | 107,000      | 1,235   | 7,600           | 77     | 16,500          | 1,677    |
| Gulf of St. Lawrence ..... |              |         |                 |        | 285,000         | 15,000   |
| Total .....                | 615,600      | 7,294   | 59,100          | 708    | 1,332,000       | 87,744   |
| West of 66° W. longitude:  |              |         |                 |        |                 |          |
| Browns Bank .....          | 165,000      | 1,885   | 8,000           | 98     | 119,300         | 9,163    |
| George Bank .....          | 370,700      | 4,986   | 68,400          | 641    | 85,660          | 7,977    |
| Cashes Bank .....          | 276,500      | 3,043   | 6,500           | 64     | 2,000           | 217      |
| Clark Bank .....           | 10,000       | 75      | 1,500           | 18     | 1,400           | 168      |
| Pippenies Bank .....       | 15,000       | 150     | 1,000           | 10     |                 |          |
| Middle Bank .....          | 758,300      | 8,946   | 34,500          | 469    | 8,700           | 914      |
| Jeffreys Ledge .....       | 1,106,100    | 12,156  | 257,400         | 2,646  | 2,700           | 255      |
| South Channel .....        | 3,689,700    | 42,236  | 236,000         | 2,183  | 39,250          | 4,434    |
| Nantucket Shoals .....     | 62,300       | 482     | 120,700         | 1,281  | 1,400           | 126      |
| Off Highland Light .....   | 256,200      | 3,454   | 11,400          | 140    | 575             | 60       |
| Off Chatham .....          | 261,900      | 3,060   | 36,500          | 384    | 200             | 16       |
| Shore, general .....       | 902,500      | 11,941  | 445,850         | 4,241  | 13,400          | 1,388    |
| Total .....                | 7,874,200    | 92,414  | 1,227,750       | 12,175 | 274,585         | 24,718   |
| Grand total .....          | 8,489,800    | 99,708  | 1,286,850       | 12,883 | 1,606,585       | 112,462  |

| Fishing-grounds.       | Mackerel, fresh. |         | Mackerel, salted. |         | Other fish, fresh. |         | Other fish, salted. |        |
|------------------------|------------------|---------|-------------------|---------|--------------------|---------|---------------------|--------|
|                        | Lbs.             | Value.  | Lbs.              | Value.  | Lbs.               | Value.  | Lbs.                | Value. |
| East of 66° W. long.:  |                  |         |                   |         |                    |         |                     |        |
| Western Bank .....     |                  |         |                   |         | 2,000              | \$60    | 10,000              | \$225  |
| Off Newfoundland ..... |                  |         |                   |         | 3,020,000          | 52,975  | 1,005,000           | 13,850 |
| Total .....            |                  |         |                   |         | 3,022,000          | 53,035  | 1,015,000           | 14,075 |
| West of 66° W. long.:  |                  |         |                   |         |                    |         |                     |        |
| Georges Bank .....     |                  |         |                   |         | 1,073,700          | 48,884  |                     |        |
| Middle Bank .....      | 8,800            | \$1,119 |                   |         |                    |         |                     |        |
| Jeffrey Ledge .....    |                  |         |                   |         | 1,500              | 111     |                     |        |
| South Channel .....    | 55,500           | 4,810   |                   |         | 1,400              | 96      |                     |        |
| Nantucket Shoals ..... | 9,000            | 675     |                   |         |                    |         |                     |        |
| Off Chatham .....      | 1,500            | 160     | 25,000            | \$2,500 | 1,782              | 69      |                     |        |
| Shore, general .....   | 723,952          | 37,141  | 171,400           | 12,195  | 1,235,450          | 21,671  | 13,000              | 195    |
| Total .....            | 798,752          | 43,905  | 196,400           | 14,695  | 2,313,832          | 70,831  | 13,000              | 195    |
| Grand total .....      | 798,752          | 43,905  | 196,400           | 14,695  | 5,335,832          | 123,866 | 1,028,000           | 14,270 |

| Fishing grounds.          | Total, fresh. |           | Total, salted. |         | Grand total. |           |
|---------------------------|---------------|-----------|----------------|---------|--------------|-----------|
|                           | Lbs.          | Value.    | Lbs.           | Value.  | Lbs.         | Value.    |
| West of 66° W. longitude: |               |           |                |         |              |           |
| Browns Bank .....         | 2,902,300     | \$54,640  |                |         | 2,902,300    | \$54,640  |
| Georges Bank .....        | 11,221,360    | 268,688   |                |         | 11,221,360   | 268,688   |
| Cashes Bank .....         | 735,700       | 12,211    |                |         | 735,700      | 12,211    |
| Clark Bank .....          | 157,400       | 2,511     |                |         | 157,400      | 2,511     |
| Pippenies Bank .....      | 20,000        | 248       |                |         | 20,000       | 248       |
| Middle Bank .....         | 3,048,300     | 65,761    |                |         | 3,048,300    | 65,761    |
| Jeffreys Ledge .....      | 3,146,600     | 60,885    |                |         | 3,146,600    | 60,885    |
| South Channel .....       | 17,976,850    | 353,079   |                |         | 17,976,850   | 353,079   |
| Nantucket Shoals .....    | 2,439,800     | 37,207    |                |         | 2,439,800    | 37,207    |
| Off Highland Light .....  | 988,175       | 21,713    |                |         | 988,175      | 21,713    |
| Off Chatham .....         | 1,292,482     | 27,099    | 25,000         | \$2,500 | 1,317,482    | 29,599    |
| Shore, general .....      | 10,677,452    | 263,208   | 184,400        | 12,390  | 10,861,852   | 275,598   |
| Total .....               | 54,606,419    | 1,167,250 | 209,400        | 14,890  | 54,815,819   | 1,182,140 |



*Summary, by fishing-grounds, of certain fishery products landed at Boston, Mass., in 1899 by American fishing vessels—Continued.*

| Fishing-grounds.           | Total, fresh. |           | Total, salted. |         | Grand total. |           |
|----------------------------|---------------|-----------|----------------|---------|--------------|-----------|
|                            | Lbs.          | Value.    | Lbs.           | Value.  | Lbs.         | Value.    |
| East of 66° W. longitude:  |               |           |                |         |              |           |
| La Have Bank .....         | 2,084,310     | \$55,468  |                |         | 2,084,310    | \$55,468  |
| Western Bank .....         | 2,061,900     | 61,352    | 60,000         | \$1,475 | 2,121,900    | 62,827    |
| Grand Bank .....           | 150,000       | 7,500     |                |         | 150,000      | 7,500     |
| Burgeo Bank .....          | 115,000       | 5,750     |                |         | 115,000      | 5,750     |
| Bacalieu Bank .....        | 50,000        | 3,500     |                |         | 50,000       | 3,500     |
| Off Newfoundland .....     | 3,200,900     | 63,575    | 1,005,000      | 13,850  | 4,205,900    | 77,425    |
| Cape Shore .....           | 891,700       | 18,646    |                |         | 891,700      | 18,646    |
| Gulf of St. Lawrence ..... | 291,000       | 15,090    |                |         | 291,000      | 15,090    |
| Total .....                | 8,843,910     | 230,881   | 1,065,000      | 15,325  | 9,908,910    | 246,206   |
| Grand total .....          | 63,450,329    | 1,398,131 | 1,274,400      | 30,215  | 64,724,729   | 1,428,346 |

There were 112,049,572 pounds of fish landed at Gloucester, valued at \$2,765,306, an increase over the previous year of 23,325,402 pounds and \$817,858. The increase is shown in the quantity and value of both fresh and salted fish, in the former amounting to 9,436,768 pounds, worth \$252,391, and in the latter to 13,888,634 pounds, worth \$565,467.

The fares landed at Gloucester numbered 3,954, of which 867 were from the Eastern banks and 3,087 from grounds off the New England coast. The total of fresh and salted fish from the Eastern banks was 72,924,652 pounds, valued at \$1,750,896, and from grounds off the New England coast 39,124,920 pounds, valued at \$1,006,410.

*Summary, by fishing-grounds, of certain fishery products landed at Gloucester, Mass., in 1899 by American fishing vessels.*

| Fishing-grounds.       | No. of trips. | Cod, fresh. |          | Cod, salted. |           | Cusk, fresh. |          | Cusk, salted. |        |
|------------------------|---------------|-------------|----------|--------------|-----------|--------------|----------|---------------|--------|
|                        |               | Lbs.        | Value.   | Lbs.         | Value.    | Lbs.         | Value.   | Lbs.          | Value. |
| East of 66° W. long.:  |               |             |          |              |           |              |          |               |        |
| La Have Bank .....     | 200           | 4,162,386   | \$79,921 | 485,400      | \$13,354  | 1,025,962    | \$13,570 | 11,000        | \$248  |
| Western Bank .....     | 172           | 8,945,058   | 142,065  | 2,142,500    | 59,346    | 153,710      | 1,975    | 18,000        | 451    |
| Quereau Bank .....     | 215           | 7,641,420   | 126,069  | 5,043,367    | 135,757   | 46,000       | 583      | 6,000         | 135    |
| Green Bank .....       | 2             | 75,000      | 1,350    | 53,000       | 1,478     |              |          |               |        |
| Grand Bank .....       | 100           |             |          | 17,378,595   | 444,443   |              |          |               |        |
| Canso Bank .....       | 1             | 77,000      | 1,386    |              |           |              |          |               |        |
| Burgeo Bank .....      | 2             |             |          |              |           |              |          |               |        |
| Bacalieu Bank .....    | 56            |             |          | 21,500       | 613       |              |          |               |        |
| Off Newfoundland ..... | 100           | 30,000      | 495      | 201,380      | 5,786     |              |          |               |        |
| Cape North .....       | 3             | 50,000      | 935      | 397,000      | 10,523    |              |          |               |        |
| Cape Shore .....       | 16            | 325,000     | 5,232    | 135,000      | 4,191     | 12,000       | 150      |               |        |
| Total .....            | 867           | 21,305,864  | 357,453  | 25,857,742   | 675,491   | 1,237,672    | 16,278   | 35,000        | 834    |
| West of 66° W. long.:  |               |             |          |              |           |              |          |               |        |
| Browns Bank .....      | 48            | 862,287     | 16,312   | 244,000      | 6,894     | 192,188      | 2,570    |               |        |
| Georges Bank .....     | 568           | 2,828,902   | 58,736   | 10,208,534   | 325,213   | 374,077      | 4,814    | 186,122       | 4,197  |
| Cashes Bank .....      | 55            | 847,189     | 15,500   |              |           | 336,030      | 4,478    | 6,865         | 154    |
| Bay of Fundy .....     | 8             | 101,760     | 1,679    |              |           | 62,745       | 775      |               |        |
| Middle Bank .....      | 32            | 4,000       | 90       |              |           |              |          |               |        |
| German Bank .....      | 4             | 41,945      | 762      |              |           | 46,236       | 593      |               |        |
| Jeffreys Ledge .....   | 1             | 2,000       | 50       |              |           |              |          |               |        |
| Ipswich Bay .....      | 8             | 135,345     | 2,515    |              |           |              |          |               |        |
| South Channel .....    | 7             |             |          |              |           |              |          |               |        |
| Nantucket Shoals ..... | 13            | 35,750      | 664      | 249,373      | 6,822     |              |          |               |        |
| Block Island .....     | 26            | 25,000      | 467      | 142,000      | 3,958     |              |          |               |        |
| Shore, general .....   | 2,317         | 2,418,996   | 52,346   | 154,000      | 4,138     | 59,801       | 782      |               |        |
| Total .....            | 3,087         | 7,303,174   | 149,121  | 10,997,907   | 347,025   | 1,071,077    | 14,007   | 192,987       | 4,351  |
| Grand total .....      | 3,954         | 28,609,038  | 506,574  | 36,855,649   | 1,022,516 | 2,308,749    | 30,285   | 227,987       | 5,185  |

## 170 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Summary, by fishing-grounds, of certain fishery products landed at Gloucester, Mass., in 1899 by American fishing vessels—Continued.

| Fishing-grounds.      | Haddock, fresh. |          | Haddock, salted. |        | Hake, fresh. |          | Hake, salted. |        |
|-----------------------|-----------------|----------|------------------|--------|--------------|----------|---------------|--------|
|                       | Lbs.            | Value.   | Lbs.             | Value. | Lbs.         | Value.   | Lbs.          | Value. |
| East of 66° W. long.: |                 |          |                  |        |              |          |               |        |
| La Have Bank          | 1,962,008       | \$28,279 |                  |        | 3,485,154    | \$29,637 | 15,000        | \$188  |
| Western Bank          | 909,025         | 10,037   |                  |        | 786,670      | 6,885    | 12,000        | 200    |
| Quereau Bank          | 109,000         | 925      |                  |        | 124,440      | 1,086    | 4,000         | 110    |
| Cape Shore            | 10,000          | 150      |                  |        | 45,000       | 383      |               |        |
| Total                 | 2,990,033       | 39,391   |                  |        | 4,441,264    | 37,991   | 31,600        | 498    |
| West of 66° W. long.: |                 |          |                  |        |              |          |               |        |
| Browns Bank           | 342,309         | 4,510    |                  |        | 361,260      | 2,902    |               |        |
| Georges Bank          | 4,183,012       | 65,013   | 4,000            | \$50   | 418,548      | 3,683    | 9,500         | 119    |
| Cashes Bank           | 165,818         | 2,085    |                  |        | 1,104,440    | 9,300    |               |        |
| Clark Bank            | 13,150          | 79       |                  |        | 295,320      | 2,095    |               |        |
| Middle Bank           | 7,000           | 158      |                  |        | 35,000       | 525      |               |        |
| German Bank           | 5,450           | 67       |                  |        | 130,360      | 977      |               |        |
| Jeffreys Ledge        | 1,000           | 23       |                  |        | 20,000       | 300      |               |        |
| Ipswich Bay           | 1,970           | 26       |                  |        | 1,445        | 11       |               |        |
| Nantucket Shoals      | 1,000           | 9        |                  |        |              |          |               |        |
| Block Island          | 30,000          | 225      | 9,000            | 113    |              |          | 13,000        | 190    |
| Shore, general        | 405,466         | 7,417    | 2,279            | 24     | 1,359,167    | 20,824   |               |        |
| Total                 | 5,156,175       | 79,612   | 15,279           | 187    | 3,725,540    | 40,617   | 22,500        | 309    |
| Grand total           | 8,146,208       | 119,003  | 15,279           | 187    | 8,166,804    | 78,608   | 53,500        | 807    |

| Fishing-grounds.      | Pollock, fresh. |        | Pollock, salted. |        | Halibut, fresh. |          | Halibut, salted. |         |
|-----------------------|-----------------|--------|------------------|--------|-----------------|----------|------------------|---------|
|                       | Lbs.            | Value. | Lbs.             | Value. | Lbs.            | Value.   | Lbs.             | Value.  |
| East of 66° W. long.: |                 |        |                  |        |                 |          |                  |         |
| La Have Bank          | 84,514          | \$588  |                  |        | 150,731         | \$12,840 |                  |         |
| Western Bank          | 65,458          | 372    | 6,500            | \$81   | 150,733         | 12,679   |                  |         |
| Quereau Bank          | 9,000           | 68     |                  |        | 1,714,644       | 132,426  |                  |         |
| Green Bank            |                 |        |                  |        | 17,167          | 740      |                  |         |
| Grand Bank            |                 |        |                  |        | 596,794         | 37,353   | 39,790           | \$1,850 |
| Canso Bank            |                 |        |                  |        | 4,000           | 240      |                  |         |
| Burgeau Bank          |                 |        |                  |        | 89,450          | 2,924    |                  |         |
| Bacalieu Bank         |                 |        |                  |        | 2,199,932       | 147,778  | 747,000          | 57,268  |
| Off Newfoundland      |                 |        |                  |        | 1,276,962       | 47,775   |                  |         |
| Cape North            |                 |        |                  |        |                 |          | 2,000            | 100     |
| Total                 | 158,972         | 1,028  | 6,500            | 81     | 6,200,463       | 394,755  | 788,790          | 59,218  |
| West of 66° W. long.: |                 |        |                  |        |                 |          |                  |         |
| Browns Bank           | 10,859          | 66     |                  |        | 3,880           | 296      |                  |         |
| Georges Bank          | 36,767          | 319    | 14,500           | 181    | 425,264         | 33,268   |                  |         |
| Cashes Bank           | 15,077          | 75     |                  |        |                 |          |                  |         |
| Clark Bank            | 4,120           | 22     |                  |        |                 |          |                  |         |
| German Bank           | 370             | 2      |                  |        |                 |          |                  |         |
| Ipswich Bay           | 3,010           | 16     |                  |        |                 |          |                  |         |
| Nantucket Shoals      | 540             | 3      | 1,000            | 12     | 200             | 10       |                  |         |
| Block Island          |                 |        | 2,000            | 25     |                 |          |                  |         |
| Shore, general        | 5,826,537       | 39,616 | 120,000          | 1,500  |                 |          |                  |         |
| Total                 | 5,897,280       | 40,149 | 137,500          | 1,718  | 429,344         | 33,574   |                  |         |
| Grand total           | 6,056,252       | 41,147 | 144,000          | 1,799  | 6,629,807       | 428,329  | 788,790          | 59,218  |

| Fishing-grounds.      | Mackerel, fresh. |         | Mackerel, salted. |          | Other fish, fresh. |        | Other fish, salted. |          |
|-----------------------|------------------|---------|-------------------|----------|--------------------|--------|---------------------|----------|
|                       | Lbs.             | Value.  | Lbs.              | Value.   | Lbs.               | Value. | Lbs.                | Value.   |
| East of 66° W. long.: |                  |         |                   |          |                    |        |                     |          |
| Quereau Bank          |                  |         |                   |          | 352                | \$49   |                     |          |
| Off Newfoundland      |                  |         |                   |          | 3,302,000          | 72,645 | 6,407,000           | \$91,910 |
| Cape Shore            |                  |         | 162,000           | \$11,274 |                    |        |                     |          |
| Total                 |                  |         | 162,000           | 11,274   | 3,302,352          | 72,694 | 6,407,000           | 91,910   |
| West of 66° W. long.: |                  |         |                   |          |                    |        |                     |          |
| Georges Banks         |                  |         | 177,200           | 9,242    | 38,611             | 1,308  |                     |          |
| Middle Bank           | 18,540           | \$1,702 | 475,400           | 35,145   |                    |        |                     |          |
| Ipswich Bay           |                  |         |                   |          |                    |        | 7,000               | 97       |
| South Channel         | 30,960           | 988     | 40,600            | 3,477    |                    |        |                     |          |
| Block Island          | 18,776           | 1,075   | 72,000            | 4,046    | 229                | 16     |                     |          |
| Shore, general        | 362,512          | 23,608  | 2,738,600         | 212,386  | 134,729            | 1,591  | 61,000              | 1,069    |
| Total                 | 430,788          | 27,373  | 3,503,800         | 264,296  | 173,569            | 2,915  | 68,000              | 1,186    |
| Grand total           | 430,788          | 27,373  | 3,665,800         | 275,570  | 3,475,921          | 75,609 | 6,475,000           | 93,096   |

*Summary, by fishing-grounds, of certain fishery products landed at Gloucester, Mass., in 1899 by American fishing vessels—Continued.*

| Fishing-grounds.                 | Total fresh.      |                  | Total salted.     |                  | Grand total.       |                  |
|----------------------------------|-------------------|------------------|-------------------|------------------|--------------------|------------------|
|                                  | Lbs.              | Value.           | Lbs.              | Value.           | Lbs.               | Value.           |
| <b>East of 66° W. longitude:</b> |                   |                  |                   |                  |                    |                  |
| La Have Bank .....               | 10,870,755        | \$164,835        | 511,400           | \$13,790         | 11,382,155         | \$178,625        |
| Western Bank .....               | 11,010,704        | 174,013          | 2,179,000         | 60,078           | 13,189,704         | 234,091          |
| Quereau Bank .....               | 9,644,856         | 261,206          | 5,053,367         | 136,002          | 14,698,223         | 397,208          |
| Green Bank .....                 | 92,167            | 2,090            | 53,000            | 1,478            | 145,167            | 3,568            |
| Grand Bank .....                 | 596,794           | 37,353           | 17,418,385        | 446,293          | 18,015,179         | 483,646          |
| Canso Bank .....                 | 81,000            | 1,626            | -----             | -----            | 81,000             | 1,626            |
| Burgeo Bank .....                | 89,450            | 2,924            | -----             | -----            | 89,450             | 2,924            |
| Bacalieu Bank .....              | 2,199,932         | 147,778          | 768,500           | 57,881           | 2,968,432          | 205,659          |
| Off Newfoundland .....           | 4,608,962         | 120,915          | 6,608,380         | 97,696           | 11,217,342         | 218,611          |
| Cape North .....                 | 50,000            | 935              | 399,000           | 10,623           | 449,000            | 11,558           |
| Cape Shore .....                 | 392,000           | 5,915            | 297,000           | 15,465           | 689,000            | 21,380           |
| <b>Total .....</b>               | <b>39,636,620</b> | <b>919,590</b>   | <b>33,288,032</b> | <b>839,306</b>   | <b>72,924,652</b>  | <b>1,753,896</b> |
| <b>West of 66° W. longitude:</b> |                   |                  |                   |                  |                    |                  |
| Browns Bank .....                | 1,772,783         | 26,656           | 244,000           | 6,894            | 2,016,783          | 33,550           |
| Georges Bank .....               | 8,305,181         | 167,141          | 10,599,856        | 339,002          | 18,905,037         | 506,143          |
| Cashes Bank .....                | 2,468,554         | 31,433           | 6,865             | 154              | 2,475,419          | 31,587           |
| Clark Bank .....                 | 477,095           | 4,650            | -----             | -----            | 477,095            | 4,650            |
| Middle Bank .....                | 64,540            | 2,475            | 475,400           | 35,145           | 539,940            | 37,620           |
| German Bank .....                | 224,361           | 2,401            | -----             | -----            | 224,361            | 2,401            |
| Jeffreys Ledge .....             | 23,000            | 373              | -----             | -----            | 23,000             | 373              |
| Ipswich Bay .....                | 141,770           | 2,568            | 7,000             | 97               | 148,770            | 2,665            |
| South Channel .....              | 30,960            | 988              | 40,600            | 3,477            | 71,560             | 4,465            |
| Nantucket Shoals .....           | 37,490            | 686              | 250,373           | 6,834            | 287,863            | 7,520            |
| Block Island .....               | 74,005            | 1,783            | 238,000           | 8,332            | 312,005            | 10,115           |
| Shore, general .....             | 10,567,208        | 146,184          | 3,075,879         | 219,137          | 13,643,087         | 365,321          |
| <b>Total .....</b>               | <b>24,186,947</b> | <b>387,338</b>   | <b>14,937,973</b> | <b>619,072</b>   | <b>39,124,920</b>  | <b>1,006,410</b> |
| <b>Grand total .....</b>         | <b>63,823,567</b> | <b>1,306,928</b> | <b>48,226,005</b> | <b>1,458,378</b> | <b>112,049,572</b> | <b>2,765,306</b> |

*Statement, by months, of quantities and values of certain fishery products landed at Boston and Gloucester by American fishing vessels during 1899.*

| Months.                                   | No. of trips. | Cod, fresh.       |                | Cod, salted.      |                  | Cusk, fresh.     |               | Cusk, salted.  |              |
|---|---------------|-------------------|----------------|-------------------|------------------|------------------|---------------|----------------|--------------|
|   |               | Lbs.              | Value.         | Lbs.              | Value.           | Lbs.             | Value.        | Lbs.           | Value.       |
| January .....                             | 317           | 1,080,150         | \$32,350       | -----             | -----            | 51,500           | \$1,024       | -----          | -----        |
| February .....                            | 216           | 635,650           | 20,834         | -----             | -----            | 79,000           | 1,299         | -----          | -----        |
| March .....                               | 298           | 1,386,850         | 47,953         | -----             | -----            | 39,500           | 890           | -----          | -----        |
| April .....                               | 427           | 1,514,400         | 27,565         | -----             | -----            | 162,300          | 1,816         | -----          | -----        |
| May .....                                 | 393           | 2,163,200         | 35,548         | -----             | -----            | 267,000          | 2,469         | -----          | -----        |
| June .....                                | 286           | 2,059,350         | 34,153         | -----             | -----            | 109,500          | 1,095         | -----          | -----        |
| July .....                                | 307           | 2,297,950         | 42,636         | -----             | -----            | 37,000           | 408           | -----          | -----        |
| August .....                              | 301           | 2,195,300         | 42,462         | -----             | -----            | 42,000           | 403           | -----          | -----        |
| September .....                           | 270           | 1,889,700         | 46,056         | 50,000            | \$1,250          | 30,500           | 393           | -----          | -----        |
| October .....                             | 394           | 1,750,700         | 39,888         | -----             | -----            | 65,000           | 792           | -----          | -----        |
| November .....                            | 358           | 1,307,400         | 34,505         | -----             | -----            | 76,500           | 753           | -----          | -----        |
| December .....                            | 299           | 1,403,900         | 33,806         | -----             | -----            | 143,000          | 2,011         | -----          | -----        |
| <b>Total at Boston .....</b>              | <b>3,866</b>  | <b>19,684,550</b> | <b>437,756</b> | <b>50,000</b>     | <b>1,250</b>     | <b>1,102,800</b> | <b>13,353</b> | -----          | -----        |
| January .....                             | 276           | 664,281           | 15,246         | 187,765           | 6,010            | 113,822          | 1,488         | -----          | -----        |
| February .....                            | 177           | 903,900           | 23,751         | 223,610           | 7,071            | 131,330          | 1,886         | 6,000          | \$135        |
| March .....                               | 280           | 1,666,263         | 34,763         | 821,189           | 26,387           | 73,001           | 904           | 3,000          | 68           |
| April .....                               | 597           | 2,945,942         | 52,535         | 1,076,667         | 34,620           | 254,010          | 3,300         | 28,000         | 630          |
| May .....                                 | 418           | 2,608,474         | 46,870         | 2,122,300         | 62,214           | 619,200          | 8,052         | 41,987         | 944          |
| June .....                                | 264           | 1,043,307         | 17,553         | 2,786,621         | 77,112           | 320,588          | 4,009         | 43,000         | 969          |
| July .....                                | 273           | 1,728,327         | 30,792         | 7,313,738         | 198,484          | 452,340          | 5,657         | 76,000         | 1,743        |
| August .....                              | 249           | 4,047,543         | 73,155         | 4,268,665         | 124,114          | 122,000          | 1,554         | 10,000         | 225          |
| September .....                           | 379           | 3,390,115         | 53,654         | 5,243,931         | 140,127          | 38,000           | 1,479         | 9,000          | 198          |
| October .....                             | 378           | 5,914,950         | 96,447         | 6,668,183         | 176,455          | 89,000           | 1,263         | 11,000         | 273          |
| November .....                            | 417           | 2,627,535         | 42,736         | 4,882,700         | 129,807          | 31,335           | 419           | -----          | -----        |
| December .....                            | 246           | 1,068,401         | 19,072         | 1,260,280         | 40,115           | 64,123           | 1,274         | -----          | -----        |
| <b>Total at Gloucester .....</b>          | <b>3,954</b>  | <b>28,609,038</b> | <b>506,574</b> | <b>36,855,649</b> | <b>1,022,516</b> | <b>2,308,749</b> | <b>30,285</b> | <b>227,987</b> | <b>5,185</b> |
| <b>Grand total .....</b>                  | <b>7,820</b>  | <b>48,293,588</b> | <b>944,330</b> | <b>36,905,649</b> | <b>1,023,766</b> | <b>3,411,549</b> | <b>43,638</b> | <b>227,987</b> | <b>5,185</b> |
| <b>Landed at Boston in 1898 .....</b>     | <b>3,491</b>  | <b>14,882,500</b> | <b>317,079</b> | <b>70,000</b>     | <b>1,550</b>     | <b>1,754,100</b> | <b>24,141</b> | -----          | -----        |
| <b>Landed at Gloucester in 1898 .....</b> | <b>3,441</b>  | <b>16,792,005</b> | <b>279,872</b> | <b>26,416,021</b> | <b>666,819</b>   | <b>3,163,933</b> | <b>36,070</b> | <b>107,190</b> | <b>2,395</b> |

## 172 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Statement, by months, of quantities and values of fishery products landed at Boston and Gloucester by American fishing vessels during 1899—Continued.

| Months.                      | Haddock, fresh. |          | Haddock, salted. |        | Hake, fresh. |         | Hake, salted. |        |
|------------------------------|-----------------|----------|------------------|--------|--------------|---------|---------------|--------|
|                              | Lbs.            | Value.   | Lbs.             | Value. | Lbs.         | Value.  | Lbs.          | Value. |
| January                      | 2,044,910       | \$47,265 |                  |        | 337,100      | \$7,578 |               |        |
| February                     | 2,337,750       | 49,909   |                  |        | 207,100      | 4,646   |               |        |
| March                        | 2,350,600       | 67,641   |                  |        | 114,000      | 2,700   |               |        |
| April                        | 2,556,350       | 39,229   |                  |        | 261,600      | 3,375   |               |        |
| May                          | 1,545,900       | 36,221   |                  |        | 537,000      | 4,456   |               |        |
| June                         | 1,752,850       | 28,275   |                  |        | 393,550      | 3,576   |               |        |
| July                         | 2,061,200       | 29,196   |                  |        | 444,600      | 4,235   |               |        |
| August                       | 2,225,300       | 42,807   |                  |        | 478,650      | 4,750   |               |        |
| September                    | 2,476,800       | 49,518   |                  |        | 751,100      | 9,249   |               |        |
| October                      | 2,677,700       | 62,972   |                  |        | 2,297,200    | 23,876  |               |        |
| November                     | 1,629,400       | 53,664   |                  |        | 1,844,200    | 19,419  |               |        |
| December                     | 1,486,400       | 47,501   |                  |        | 823,700      | 11,848  |               |        |
| Total at Boston              | 25,145,160      | 554,198  |                  |        | 8,489,800    | 99,708  |               |        |
| January                      | 1,496,866       | 24,400   |                  |        | 75,272       | 1,152   |               |        |
| February                     | 1,404,030       | 25,221   |                  |        | 147,597      | 2,321   | 4,000         | \$110  |
| March                        | 1,705,155       | 28,378   |                  |        | 53,158       | 725     |               |        |
| April                        | 1,217,550       | 11,290   | 2,279            | \$24   | 360,458      | 2,702   |               |        |
| May                          | 302,720         | 2,994    |                  |        | 1,386,962    | 10,427  | 5,000         | 63     |
| June                         | 233,269         | 2,041    | 5,000            | 63     | 1,335,728    | 9,707   | 20,000        | 250    |
| July                         | 331,078         | 2,740    | 8,000            | 100    | 2,082,166    | 17,096  | 14,500        | 209    |
| August                       | 165,750         | 1,856    |                  |        | 642,703      | 5,526   |               |        |
| September                    | 43,310          | 405      |                  |        | 84,388       | 684     |               |        |
| October                      | 288,705         | 3,221    |                  |        | 767,232      | 9,100   | 10,000        | 175    |
| November                     | 490,590         | 6,748    |                  |        | 936,685      | 15,703  |               |        |
| December                     | 467,185         | 9,709    |                  |        | 292,455      | 3,465   |               |        |
| Total at Gloucester          | 8,146,208       | 119,003  | 15,279           | 187    | 8,166,804    | 78,608  | 53,500        | 807    |
| Grand total                  | 33,291,368      | 673,201  | 15,279           | 187    | 16,656,604   | 178,316 | 53,500        | 807    |
| Landed at Boston in 1898     | 21,769,300      | 378,944  |                  |        | 7,382,430    | 70,535  |               |        |
| Landed at Gloucester in 1898 | 10,712,623      | 124,390  | 36,820           | 439    | 10,119,143   | 73,981  | 18,800        | 230    |

| Months.                      | Pollock, fresh. |        | Pollock, salted. |         | Halibut, fresh. |         | Halibut, salted. |        |
|------------------------------|-----------------|--------|------------------|---------|-----------------|---------|------------------|--------|
|                              | Lbs.            | Value. | Lbs.             | Value.  | Lbs.            | Value.  | Lbs.             | Value. |
| January                      | 16,900          | \$398  |                  |         | 25,200          | \$2,682 |                  |        |
| February                     | 15,800          | 360    |                  |         | 50,600          | 3,326   |                  |        |
| March                        | 16,300          | 473    |                  |         | 60,175          | 5,620   |                  |        |
| April                        | 10,600          | 196    |                  |         | 170,800         | 12,481  |                  |        |
| May                          | 175,000         | 1,241  |                  |         | 260,500         | 15,189  |                  |        |
| June                         | 108,500         | 775    |                  |         | 375,100         | 20,237  |                  |        |
| July                         | 67,700          | 595    |                  |         | 174,000         | 14,483  |                  |        |
| August                       | 239,700         | 2,256  |                  |         | 196,060         | 12,378  |                  |        |
| September                    | 319,100         | 3,481  |                  |         | 9,600           | 1,540   |                  |        |
| October                      | 184,500         | 1,606  |                  |         | 175,800         | 10,160  |                  |        |
| November                     | 96,850          | 1,093  |                  |         | 40,550          | 3,751   |                  |        |
| December                     | 35,900          | 409    |                  |         | 68,200          | 10,615  |                  |        |
| Total at Boston              | 1,286,850       | 12,883 |                  |         | 1,606,585       | 112,462 |                  |        |
| January                      | 26,842          | 218    |                  |         | 214,415         | 21,955  |                  |        |
| February                     | 43,889          | 475    |                  |         | 355,410         | 25,021  |                  |        |
| March                        | 71,690          | 426    |                  |         | 593,445         | 40,901  |                  |        |
| April                        | 43,372          | 267    |                  |         | 548,412         | 31,339  |                  |        |
| May                          | 243,521         | 1,332  | 88,500           | \$1,104 | 600,529         | 27,815  |                  |        |
| June                         | 19,539          | 106    | 22,500           | 282     | 1,144,452       | 46,148  | 4,000            | \$180  |
| July                         | 19,158          | 119    |                  |         | 724,689         | 52,745  | 25,490           | 1,020  |
| August                       | 25,497          | 187    |                  |         | 484,114         | 35,287  | 95,500           | 5,658  |
| September                    | 221,914         | 1,601  |                  |         | 818,572         | 49,579  | 659,600          | 52,024 |
| October                      | 1,814,319       | 13,336 | 5,000            | 63      | 700,542         | 49,711  | 4,200            | 336    |
| November                     | 3,239,133       | 20,818 | 8,000            | 100     | 235,828         | 26,150  |                  |        |
| December                     | 286,878         | 2,262  | 20,000           | 250     | 209,399         | 21,678  |                  |        |
| Total at Gloucester          | 6,056,252       | 41,147 | 144,000          | 1,799   | 6,629,807       | 428,329 | 788,790          | 59,218 |
| Grand total                  | 7,343,102       | 54,030 | 144,000          | 1,799   | 8,236,392       | 540,791 | 788,790          | 59,218 |
| Landed at Boston in 1898     | 1,412,100       | 11,655 |                  |         | 768,585         | 65,133  | 250,000          | 7,650  |
| Landed at Gloucester in 1898 | 3,052,139       | 18,278 | 20,000           | 250     | 7,612,431       | 449,264 | 1,747,165        | 56,335 |

*Statement, by months, of quantities and values of fishery products landed at Boston and Gloucester by American fishing vessels during 1899—Continued.*

| Months.                      | Mackerel, fresh. |         | Mackerel, salted. |         | Other fish, fresh.* |          | Other fish, salted.* |         |
|------------------------------|------------------|---------|-------------------|---------|---------------------|----------|----------------------|---------|
|                              | Lbs.             | Value.  | Lbs.              | Value.  | Lbs.                | Value.   | Lbs.                 | Value.  |
| January                      |                  |         |                   |         | 820,000             | \$19,400 | 360,000              | \$5,400 |
| February                     |                  |         |                   |         | 1,630,000           | 24,450   | 5,000                | 150     |
| March                        |                  |         |                   |         | 570,000             | 9,125    |                      |         |
| May                          | 16,800           | \$1,281 |                   |         |                     |          |                      |         |
| June                         | 176,950          | 10,623  |                   |         | 27,450              | 332      | 10,000               | 225     |
| July                         | 130,800          | 4,190   | 23,400            | \$1,273 | 559,800             | 28,008   |                      |         |
| August                       | 53,850           | 4,733   | 49,200            | 2,538   | 653,550             | 26,546   |                      |         |
| September                    | 141,127          | 11,571  | 75,400            | 6,878   | 69,482              | 5,206    |                      |         |
| October                      | 8,625            | 777     | 44,800            | 3,718   | 506,850             | 5,583    | 13,000               | 195     |
| November                     | 271,600          | 10,730  | 3,600             | 288     | 373,900             | 3,660    |                      |         |
| December                     |                  |         |                   |         | 124,800             | 1,556    | 640,000              | 8,300   |
| Total at Boston              | 798,752          | 43,905  | 196,400           | 14,695  | 5,335,832           | 123,866  | 1,028,000            | 14,270  |
| January                      |                  |         |                   |         | 1,291,000           | 26,620   | 1,444,200            | 23,020  |
| February                     |                  |         |                   |         | 780,000             | 13,800   | 228,000              | 5,706   |
| March                        |                  |         |                   |         | 355,000             | 8,825    | 55,200               | 896     |
| May                          | 15,663           | 1,547   |                   |         |                     |          |                      |         |
| June                         | 31,925           | 2,387   | 354,000           | 22,670  |                     |          |                      |         |
| July                         | 95,906           | 2,477   | 677,800           | 35,795  | 26,740              | 910      |                      |         |
| August                       | 38,710           | 3,141   | 808,400           | 54,266  | 13,509              | 473      |                      |         |
| September                    | 93,140           | 7,207   | 1,343,400         | 118,735 | 103,320             | 932      | 47,000               | 898     |
| October                      | 155,444          | 10,614  | 447,000           | 40,338  | 352                 | 49       | 21,000               | 288     |
| November                     |                  |         | 35,200            | 3,766   | 240,000             | 1,800    | 2,048,800            | 29,945  |
| December                     |                  |         |                   |         | 666,000             | 22,200   | 2,630,800            | 34,343  |
| Total at Gloucester          | 430,788          | 27,373  | 3,665,800         | 275,570 | 3,475,921           | 75,609   | 6,475,000            | 93,096  |
| Grand total                  | 1,229,540        | 71,278  | 3,862,200         | 290,265 | 8,811,753           | 199,475  | 7,503,000            | 107,366 |
| Landed at Boston in 1898     | 439,755          | 26,280  | 414,900           | 18,335  | 5,084,900           | 113,533  | 451,000              | 6,805   |
| Landed at Gloucester in 1898 | 434,000          | 27,064  | 1,806,800         | 102,017 | 2,500,525           | 45,618   | 4,184,575            | 64,426  |

| Months.                      | Total, fresh. |           | Total, salted. |           | Grand total. |           |
|------------------------------|---------------|-----------|----------------|-----------|--------------|-----------|
|                              | Lbs.          | Value.    | Lbs.           | Value.    | Lbs.         | Value.    |
| January                      | 4,375,760     | \$110,697 | 360,000        | \$5,400   | 4,735,760    | \$116,097 |
| February                     | 4,955,900     | 104,824   | 5,000          | 150       | 4,960,900    | 104,974   |
| March                        | 4,537,425     | 134,402   |                |           | 4,537,425    | 134,402   |
| April                        | 4,676,050     | 84,662    |                |           | 4,676,050    | 84,662    |
| May                          | 4,964,900     | 96,405    |                |           | 4,964,900    | 96,405    |
| June                         | 5,003,250     | 99,066    | 10,000         | 225       | 5,013,250    | 99,291    |
| July                         | 5,772,550     | 123,751   | 23,400         | 1,273     | 5,795,950    | 125,024   |
| August                       | 6,084,410     | 136,335   | 49,200         | 2,538     | 6,133,610    | 138,873   |
| September                    | 5,687,409     | 127,014   | 125,400        | 8,128     | 5,812,809    | 135,142   |
| October                      | 7,666,375     | 145,654   | 57,800         | 3,913     | 7,724,175    | 149,567   |
| November                     | 5,640,400     | 127,575   | 3,600          | 288       | 5,644,000    | 127,863   |
| December                     | 4,085,900     | 107,746   | 640,000        | 8,300     | 4,725,900    | 116,046   |
| Total at Boston              | 63,450,329    | 1,398,131 | 1,274,400      | 30,215    | 64,724,729   | 1,428,346 |
| January                      | 3,882,498     | 91,079    | 1,631,965      | 29,030    | 5,514,463    | 120,109   |
| February                     | 3,766,156     | 92,475    | 461,610        | 11,022    | 4,227,766    | 103,497   |
| March                        | 4,517,712     | 114,922   | 879,389        | 27,351    | 5,397,101    | 142,273   |
| April                        | 5,369,744     | 101,433   | 1,106,946      | 35,274    | 6,476,690    | 136,707   |
| May                          | 5,779,069     | 99,037    | 2,257,787      | 64,325    | 8,036,856    | 163,362   |
| June                         | 4,128,808     | 81,951    | 3,235,121      | 101,526   | 7,363,929    | 183,477   |
| July                         | 5,460,404     | 112,536   | 8,115,528      | 237,351   | 13,575,932   | 349,887   |
| August                       | 5,539,826     | 121,179   | 5,182,565      | 134,263   | 10,722,391   | 305,442   |
| September                    | 4,792,759     | 114,541   | 7,302,931      | 311,982   | 12,095,690   | 426,523   |
| October                      | 9,731,044     | 183,741   | 7,166,383      | 217,928   | 16,897,427   | 401,669   |
| November                     | 7,801,106     | 114,374   | 6,974,700      | 163,618   | 14,775,806   | 277,992   |
| December                     | 3,054,441     | 79,660    | 3,911,080      | 74,708    | 6,965,521    | 154,368   |
| Total at Gloucester          | 63,823,567    | 1,306,928 | 48,226,005     | 1,455,378 | 112,049,572  | 2,765,306 |
| Grand total                  | 127,273,896   | 2,705,059 | 49,500,405     | 1,488,593 | 176,774,301  | 4,193,652 |
| Landed at Boston in 1898     | 53,493,670    | 1,007,300 | 1,185,900      | 34,340    | 54,679,570   | 1,041,640 |
| Landed at Gloucester in 1898 | 54,386,799    | 1,054,537 | 34,337,371     | 892,911   | 88,724,170   | 1,947,448 |

\* Includes herring from Newfoundland, 6,082,000 pounds frozen, \$123,820, and 7,412,000 pounds salted, \$105,760.



## FISHERIES OF THE NEW ENGLAND STATES.

There has been a decrease in the fisheries of this region, since their canvass in 1889, of 259,814,470 pounds of products, amounting to \$877,813 in value. A large part of this decrease is represented by algæ, which, if eliminated from the figures of both years, leaves an actual decrease in fish products of 111,030,570 pounds, worth \$825,512.

The catch of menhaden has largely decreased. In 1889 the quantity was 173,632,210 pounds, worth \$428,228, whereas in 1898 only 23,140,177 pounds, valued at \$65,175, were taken, a decrease of 150,492,023 pounds, worth \$363,053. The reduction in this fishery is traceable chiefly to the transfer of the industry to New York State. It is therefore apparent that the food fisheries of the New England States have increased in quantity and have decreased but slightly in value.

One of the most noticeable changes is in connection with the lobster fishery. The total catch of lobsters in 1889 was 30,449,603 pounds, worth \$833,736, and in 1898 14,661,808 pounds, worth \$1,276,968. The yield of this fishery has therefore diminished more than 50 per cent in quantity and increased more than 50 per cent in value.

The total number of persons engaged in the fisheries of the New England States was 35,445, distributed as follows: Maine, 16,954; New Hampshire, 154; Massachusetts, 14,177; Rhode Island, 1,687; and Connecticut, 2,473. A total decrease of 1,091 is shown since 1889.

The amount of capital invested in the fisheries was \$19,637,036, an apparent decrease of \$437,758, caused by the transfer of the menhaden fishery and the omission of certain valuations which were included in the former canvass.

The vessels employed in the fisheries numbered 1,427, and were valued with their outfits at \$4,224,339. The apparatus of capture was valued at \$1,218,898. Pound nets and weirs represent the greatest value among the apparatus, aggregating \$405,424. Hand and trawl lines are next in importance, valued at \$278,815. Lobster pots were worth \$219,045; seines, \$132,140, and gill nets, \$100,679.

Massachusetts leads in the New England States in respect to importance of the fisheries, the products being worth \$4,454,139. Maine is next, with fisheries valued at \$2,654,919, followed by Connecticut at \$1,559,599, Rhode Island at \$955,058, and New Hampshire at \$48,987. The yield of the entire region amounted to 393,355,570 pounds and was valued at \$9,672,702.

The fishery for cod, cusk, haddock, hake, and pollock leads all the others, being valued at \$2,798,109. The oyster fishery of Connecticut and Rhode Island, worth \$1,910,684, ranks next, followed by the lobster fishery, valued at \$1,276,967; the herring fishery at \$596,688; the halibut fishery, at \$569,515, and the mackerel fishery at \$481,933.

Other important fisheries are those maintained for alewives, smelt, blue-fish, scup, and sword-fish.

Table showing the number of persons engaged in the fisheries of the New England States in 1898.

| States.             | Fisher-<br>men. | Shores-<br>men. | Total. |
|---------------------|-----------------|-----------------|--------|
| Maine .....         | 8,717           | 8,237           | 16,954 |
| New Hampshire ..... | 143             | 11              | 154    |
| Massachusetts ..... | 10,205          | 3,972           | 14,177 |
| Rhode Island .....  | 1,340           | 347             | 1,687  |
| Connecticut .....   | 1,826           | 647             | 2,473  |
| Total .....         | 22,231          | 13,214          | 35,445 |

Table showing the investment in the fisheries of the New England States in 1898.

| Items.  | Maine.  |           | New Hampshire. |         | Massachusetts. |             |
|---|---------|-----------|----------------|---------|----------------|-------------|
|   | No.     | Value.    | No.            | Value.  | No.            | Value.      |
| Vessels .....                                   | 497     | \$538,400 | 5              | \$3,900 | 637            | \$1,776,025 |
| Tonnage .....                                   | 8,175   |           | 79             |         | 30,558         |             |
| Outfit .....                                    |         | 182,427   |                | 3,458   |                | 939,772     |
| Boats .....                                     | 5,741   | 284,897   | 123            | 5,395   | 2,625          | 178,082     |
| Seines .....                                    | 251     | 29,660    | 1              | 500     | 272            | 88,382      |
| Bag nets .....                                  | 202     | 8,645     |                |         |                |             |
| Dip nets .....                                  | 182     | 637       |                |         | 213            | 272         |
| Drag nets .....                                 |         |           |                |         | 27             | 1,610       |
| Fyke nets .....                                 | 26      | 710       |                |         | 88             | 1,124       |
| Gill nets .....                                 | 3,722   | 37,413    | 60             | 844     | 4,632          | 50,312      |
| Pound nets .....                                | 67      | 14,680    | 17             | 6,960   | 126            | 141,835     |
| Snap nets .....                                 | 20      | 20        |                |         |                |             |
| Trap nets .....                                 | 33      | 14,125    |                |         | 4              | 900         |
| Weirs .....                                     | 557     | 111,618   |                |         |                |             |
| Lines, hand and trawl .....                     |         | 51,965    |                | 2,118   |                | 221,365     |
| Pots, eel .....                                 | 333     | 188       |                |         | 1,290          | 2,376       |
| Pots, lobster .....                             | 155,978 | 155,777   | 1,675          | 1,666   | 26,254         | 31,481      |
| Harpoons .....                                  |         | 1,155     |                |         |                | 1,200       |
| Spears .....                                    | 145     | 127       |                |         |                |             |
| Dredges, tongs, rakes, hoes,<br>and forks ..... |         | 2,032     |                | 32      |                | 15,199      |
| Other apparatus .....                           |         |           |                |         |                | 469         |
| Shore and accessory prop-<br>erty .....         |         | 1,193,478 |                | 12,775  |                | 5,125,248   |
| Cash capital .....                              |         | 1,385,099 |                | 15,000  |                | 4,797,250   |
| Total .....                                     |         | 4,013,053 |                | 52,648  |                | 13,372,902  |

| Items.  | Rhode Island. |           | Connecticut. |           | Total.  |             |
|---|---------------|-----------|--------------|-----------|---------|-------------|
|   | No.           | Value.    | No.          | Value.    | No.     | Value.      |
| Vessels .....                                   | 93            | \$167,850 | 195          | \$434,650 | 1,427   | \$2,920,825 |
| Tonnage .....                                   | 1,454         |           | 3,555        |           | 43,821  |             |
| Outfit .....                                    |               | 46,597    |              | 131,260   |         | 1,303,514   |
| Boats .....                                     | 854           | 72,381    | 1,214        | 80,915    | 10,557  | 621,670     |
| Seines .....                                    | 49            | 7,243     | 67           | 6,355     | 640     | 132,140     |
| Bag nets .....                                  |               |           |              |           | 202     | 8,645       |
| Dip nets .....                                  |               |           |              |           | 395     | 909         |
| Drag nets .....                                 |               |           |              |           | 27      | 1,610       |
| Fyke nets .....                                 | 329           | 2,462     | 410          | 3,522     | 853     | 7,818       |
| Gill nets .....                                 | 134           | 7,085     | 89           | 5,025     | 8,637   | 100,679     |
| Pound nets .....                                | 202           | 110,395   | 66           | 19,930    | 478     | 293,800     |
| Snap nets .....                                 | 4             | 20        |              |           | 24      | 40          |
| Trap nets .....                                 |               |           |              |           | 37      | 15,025      |
| Weirs .....                                     |               |           |              |           | 557     | 111,618     |
| Lines, hand and trawl .....                     |               | 2,010     |              | 1,357     |         | 278,815     |
| Pots, eel .....                                 | 3,139         | 1,987     | 1,313        | 1,197     | 6,075   | 5,748       |
| Pots, lobster .....                             | 10,312        | 12,716    | 10,830       | 17,405    | 205,049 | 219,045     |
| Harpoons .....                                  |               | 109       |              | 177       |         | 2,641       |
| Spears .....                                    | 29            | 46        | 56           | 37        | 220     | 210         |
| Dredges, tongs, rakes, hoes,<br>and forks ..... |               | 6,549     |              | 15,131    |         | 38,943      |
| Other apparatus .....                           |               | 43        |              | 700       |         | 1,212       |
| Shore and accessory prop-<br>erty .....         |               | 439,149   |              | 344,380   |         | 7,115,030   |
| Cash capital .....                              |               | 80,500    |              | 172,250   |         | 6,457,099   |
| Total .....                                     |               | 957,142   |              | 1,241,291 |         | 19,637,036  |

## 176 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the quantity and value of products taken in the fisheries of the New England States in 1898.

| Species.                | Maine.      |           | New Hampshire. |        | Massachusetts. |           |
|-------------------------|-------------|-----------|----------------|--------|----------------|-----------|
|                         | Lbs.        | Value.    | Lbs.           | Value. | Lbs.           | Value.    |
| Alewives, fresh         | 925,325     | \$8,016   | 25,000         | \$250  | 1,877,061      | \$22,268  |
| Alewives, salted        | 986,600     | 8,437     | 200,000        | 2,500  | 586,700        | 6,790     |
| Alewives, smoked        | 606,800     | 8,849     |                |        | 71,440         | 2,230     |
| Blue-fish               |             |           |                |        | 832,849        | 38,069    |
| Bonito                  |             |           |                |        | 89,136         | 2,410     |
| Butter-fish             | 14,800      | 740       |                |        | 30,620         | 818       |
| Cod, fresh              | 10,091,088  | 167,231   | 689,150        | 10,756 | 40,632,151     | 688,721   |
| Cod, salted             | 5,232,622   | 147,024   | 2,000          | 70     | 30,682,827     | 718,318   |
| Cunners                 | 148,300     | 1,025     |                |        | 85,350         | 5,250     |
| Cusk, fresh             | 1,138,201   | 12,545    | 97,500         | 995    | 5,825,173      | 63,308    |
| Cusk, salted            | 86,667      | 1,210     |                |        | 128,863        | 2,206     |
| Eels                    | 163,811     | 12,942    |                |        | 425,846        | 17,635    |
| Flounders and flat-fish | 786,697     | 17,539    |                |        | 1,167,312      | 14,761    |
| Haddock, fresh          | 7,274,909   | 119,982   | 1,379,750      | 14,552 | 35,451,284     | 418,526   |
| Haddock, salted         | 956,657     | 12,369    | 4,000          | 100    | 130,230        | 1,292     |
| Hake, fresh             | 13,329,899  | 110,558   | 115,400        | 1,379  | 21,099,428     | 161,496   |
| Hake, salted            | 2,405,578   | 23,886    | 1,500          | 38     | 232,388        | 2,139     |
| Halibut, fresh          | 304,890     | 22,075    |                |        | 8,663,443      | 487,714   |
| Halibut, salted         |             |           |                |        | 1,859,854      | 59,726    |
| Herring, fresh          | 37,017,814  | 174,313   | 65,000         | 650    | 16,562,338     | 256,335   |
| Herring, salted         | 1,400,650   | 26,159    |                |        | 5,801,159      | 76,212    |
| Herring, smoked         | 3,738,500   | 63,005    |                |        |                |           |
| Mackerel, fresh         | 1,441,157   | 85,344    | 58,750         | 3,207  | 3,791,233      | 197,339   |
| Mackerel, salted        | 163,000     | 12,761    |                |        | 2,912,131      | 164,525   |
| Menhaden                | 7,319,900   | 20,706    |                |        | 1,497,367      | 10,544    |
| Pollock, fresh          | 1,126,746   | 8,463     | 180,200        | 1,559  | 6,566,388      | 38,256    |
| Pollock, salted         | 1,002,704   | 10,901    | 1,200          | 24     | 517,649        | 4,789     |
| Salmon                  | 53,322      | 10,009    |                |        | 60             | 30        |
| Scup                    |             |           |                |        | 1,043,625      | 14,253    |
| Sea bass                |             |           |                |        | 99,300         | 4,946     |
| Shad                    | 861,879     | 19,752    |                |        | 29,333         | 1,426     |
| Smelt                   | 1,608,045   | 139,345   |                |        | 7,079          | 515       |
| Squeteague              |             |           |                |        | 1,371,910      | 39,518    |
| Striped bass            | 25,067      | 4,206     | 850            | 85     | 12,948         | 939       |
| Sword-fish              | 878,290     | 44,395    |                |        | 597,186        | 35,280    |
| Tautog                  |             |           |                |        | 289,505        | 7,567     |
| Tomcod                  | 310,083     | 6,158     |                |        |                |           |
| Miscellaneous fish      | 16,275      | 408       | 1,650          | 165    | 147,672        | 5,692     |
| Refuse fish             | 55,000      | 354       |                |        |                |           |
| Squid                   |             |           |                |        | 1,069,425      | 14,620    |
| Lobsters                | 11,183,294  | 992,855   | 108,515        | 9,372  | 1,693,741      | 147,702   |
| Shrimp                  |             |           |                |        | 25,200         | 1,183     |
| Quahogs or hard clams   |             |           |                |        | 510,536        | 50,724    |
| Clams (soft), fresh     | 8,758,800   | 274,885   | 6,000          | 360    | 1,470,951      | 102,594   |
| Clams (soft), salted    | 711,200     | 48,568    |                |        |                |           |
| Oysters                 |             |           |                |        | 708,575        | 156,235   |
| Scallops                | 166,509     | 14,522    |                |        | 773,176        | 85,383    |
| Irish moss              |             |           | 70,000         | 2,450  | 700,000        | 22,375    |
| Oil, fish               | 157,920     | 4,591     | 14,250         | 475    | 358,927        | 13,963    |
| Oil, sea elephant       |             |           |                |        | 472,500        | 20,790    |
| Oil, whale              |             |           |                |        | 3,119,450      | 199,023   |
| Whalebone               |             |           |                |        | 27,100         | 65,875    |
| Other products          | 955,562     | 18,791    |                |        | 107,062        | 3,810     |
| Total                   | 123,404,561 | 2,654,919 | 3,020,715      | 48,987 | 202,155,481    | 4,454,139 |

| Species.                | Rhode Island. |         | Connecticut. |         | Total.     |          |
|-------------------------|---------------|---------|--------------|---------|------------|----------|
|                         | Lbs.          | Value.  | Lbs.         | Value.  | Lbs.       | Value.   |
| Alewives, fresh         | 628,132       | \$6,621 | 868,400      | \$7,346 | 4,323,918  | \$44,501 |
| Alewives, salted        | 74,100        | 940     |              |         | 1,847,400  | 18,667   |
| Alewives, smoked        | 136,390       | 2,712   |              |         | 814,630    | 13,791   |
| Blue fish               | 330,290       | 15,521  | 963,285      | 32,851  | 2,126,424  | 86,461   |
| Bonito                  | 124,450       | 2,615   |              |         | 213,586    | 5,025    |
| Butter-fish             | 207,000       | 5,615   | 60,280       | 2,370   | 312,700    | 9,543    |
| Cod, fresh              | 1,111,811     | 23,556  | 451,225      | 10,978  | 52,975,425 | 901,242  |
| Cod, salted             | 315,101       | 13,154  |              |         | 36,232,550 | 878,566  |
| Cunners                 | 3,300         | 100     |              |         | 236,950    | 6,375    |
| Cusk, fresh             |               |         |              |         | 7,060,874  | 74,848   |
| Cusk, salted            |               |         |              |         | 215,530    | 3,416    |
| Eels                    | 443,374       | 20,030  | 206,970      | 14,149  | 1,240,001  | 64,756   |
| Flounders and flat-fish | 1,710,057     | 27,576  | 443,864      | 13,383  | 4,107,930  | 73,259   |
| Haddock, fresh          | 366,525       | 8,373   | 112,800      | 856     | 44,585,268 | 562,289  |
| Haddock, salted         |               |         |              |         | 1,090,887  | 13,761   |
| Hake, fresh             |               |         |              |         | 34,544,727 | 273,432  |
| Hake, salted            |               |         |              |         | 2,639,466  | 26,063   |
| Halibut, fresh          |               |         |              |         | 8,968,333  | 509,789  |
| Halibut, salted         |               |         |              |         | 1,859,854  | 59,726   |
| Herring, fresh          | 2,000         | 10      |              |         | 53,647,152 | 431,308  |

Table showing the quantity and value of products taken in the fisheries of the New England States in 1898—Continued.

| Species.              | Rhode Island. |          | Connecticut. |           | Total.      |           |
|-----------------------|---------------|----------|--------------|-----------|-------------|-----------|
|                       | Lbs.          | Value.   | Lbs.         | Value.    | Lbs.        | Value.    |
| Herring, salted       |               |          |              |           | 7,201,809   | \$102,371 |
| Herring, smoked       |               |          |              |           | 3,738,500   | 63,005    |
| Mackerel, fresh       | 359,900       | \$15,004 | 40,913       | \$1,753   | 5,691,953   | 302,647   |
| Mackerel, salted      |               |          | 28,000       | 2,000     | 3,103,131   | 179,286   |
| Menhaden              | 3,140,000     | 7,591    | 11,182,910   | 26,334    | 23,140,177  | 65,175    |
| Pollock, fresh        | 50,000        | 500      |              |           | 7,923,334   | 48,778    |
| Pollock, salted       |               |          |              |           | 1,521,553   | 15,714    |
| Salmon                |               |          |              |           | 53,382      | 10,039    |
| Scup                  | 6,390,225     | 75,596   | 101,040      | 3,504     | 7,534,890   | 93,353    |
| Sea bass              | 440,950       | 11,935   | 247,789      | 12,182    | 788,039     | 29,063    |
| Shad                  | 25,112        | 1,625    | 499,325      | 21,215    | 1,415,649   | 44,018    |
| Smelt                 | 4,100         | 215      | 5,600        | 837       | 1,624,824   | 140,912   |
| Squeteague            | 3,125,635     | 63,976   | 193,643      | 5,451     | 4,691,188   | 108,945   |
| Striped bass          | 101,950       | 10,511   | 13,845       | 1,662     | 154,660     | 17,403    |
| Sword-fish            | 55,875        | 2,935    | 85,980       | 7,520     | 1,617,331   | 90,130    |
| Tautog                | 248,129       | 7,214    | 70,540       | 3,118     | 608,174     | 17,899    |
| Tomcod                | 8,000         | 240      | 38,750       | 1,677     | 356,833     | 8,075     |
| Miscellaneous fish    | 314,123       | 8,402    | 82,923       | 3,489     | 562,643     | 18,156    |
| Refuse fish           | 1,012,000     | 1,222    |              |           | 1,067,000   | 1,576     |
| Squid                 | 124,000       | 1,375    | 6,900        | 150       | 1,200,325   | 16,145    |
| Crabs, hard           | 7,875         | 575      |              |           | 7,875       | 575       |
| Crabs, soft           | 5,020         | 1,675    |              |           | 5,020       | 1,675     |
| Lobsters              | 578,066       | 43,290   | 1,098,192    | 83,748    | 14,661,808  | 1,276,967 |
| Shrimp                | 2,250         | 750      |              |           | 27,450      | 1,933     |
| Quahogs or hard clams | 249,695       | 31,816   | 234,000      | 29,900    | 994,232     | 112,440   |
| Clams (soft), fresh   | 150,150       | 20,569   | 199,800      | 19,039    | 10,585,701  | 417,447   |
| Clams (soft), salted  |               |          |              |           | 711,200     | 48,568    |
| Oysters               | 3,201,646     | 505,378  | 14,633,283   | 1,249,071 | 18,543,504  | 1,910,648 |
| Scallops              | 115,386       | 10,471   | 50,160       | 5,016     | 1,105,231   | 115,392   |
| Irish moss            |               |          |              |           | 770,000     | 24,825    |
| Oyster shells         | 7,674,000     | 3,968    |              |           | 7,674,000   | 3,968     |
| Oil, fish             |               |          |              |           | 531,097     | 19,029    |
| Oil, sea elephant     |               |          |              |           | 472,500     | 20,790    |
| Oil, whale            |               |          |              |           | 3,119,450   | 199,023   |
| Whalebone             |               |          |              |           | 27,100      | 65,875    |
| Other products        | 17,778        | 1,402    |              |           | 1,080,402   | 24,003    |
| Total                 | 32,854,396    | 955,058  | 31,920,417   | 1,559,599 | 393,355,570 | 9,672,702 |

## THE FUR-SEAL ROOKERIES OF THE PRIBILOF ISLANDS.

Near the close of the fiscal year Mr. Townsend left for the Pribilof Islands to ascertain the condition of the fur-seal rookeries, in accordance with the requirements of the law respecting the relations of the Fish Commission with the fur-seal fisheries. The customary records relating to the size of the rookeries in 1899 were secured in part by the resident Treasury agents upon the islands. The American seal herd is still declining on account of the continuance of pelagic sealing in Bering Sea and the North Pacific Ocean.

For a number of years all the seals born on several of the more accessible rookeries have been counted systematically. The counts, when compared with those of previous seasons, show more or less decrease in the number of seals born from year to year. The diminution of the herd is shown also in the annual photographs and charts of the rookeries. The total number of seals taken on the Pribilof Islands in 1899 by the lessees under Government supervision was 16,812. Seals of the class available for killing, the surplus males, become less in number from year to year.

The pelagic catch made from the American herd by the Canadian sealing fleet of 26 vessels during 1899 was 33,755. Of this number 23,284 were taken in Bering Sea and 10,471 in the North Pacific Ocean.

To the vessel catch should be added 892 seals taken off the Northwest coast by Indian canoes. The only Canadian vessel sealing in Asiatic waters took 699 seals, but a fleet of 11 Japanese vessels secured 7,308 seals from the Asiatic herd. One American vessel obtained 336 seals from the American herd in waters south of the award area.

### NOTES ON THE FISHERIES.

#### THE WHALE FISHERY.

The vessels engaged in whaling during the year 1899 numbered 48, 3 additional vessels having been lost; 22 vessels were employed in the Pacific Ocean and 26 in the Atlantic. The yield of the whale fishery for the year amounted to 11,903 barrels of sperm oil, valued at \$583,274; 3,827 barrels of whale oil, valued at \$133,945, and 320,100 pounds of whalebone, valued at \$864,270.

#### CARP.

Investigations of the fisheries of the Great Lakes and the Mississippi and its tributaries, now being made by field agents of this division, reveal the fact that an important quantity of carp is finding its way into the fish markets—chiefly those of the larger Eastern cities.

The catch of carp in Lake Erie in 1899 amounted to 3,633,679 pounds, valued at \$51,456. The report of the Illinois Fishermen's Association shows that the catch of carp in the Illinois River is greater than that of all other species combined, the quantity of carp taken in 1899 amounting to 6,332,990 pounds, valued at \$189,980. The yield of carp from the Ohio River and two of its tributaries, the Cumberland and Wabash Rivers, during the same year, amounted to 113,387 pounds, worth \$6,654.

These figures show an increase in the quantity of carp derived from the above-named waters amounting to nearly nine times the quantity yielded six years ago. During the same period the total fishery products of Lake Erie increased more than 15,000,000 pounds and those of the Illinois River more than 5,000,000 pounds. There are, therefore, no indications that the presence of the carp has produced any injurious effect on the native species associated with it, but, on the contrary, its presence may have a salutary effect, the young of the carp doubtless being food for black bass and other species. It is certain that the black bass has increased in the Illinois River along with the carp, the yield of black bass in 1899 being greater than ever before, amounting to over 70,000 pounds. The last canvass of the fisheries of the Middle Atlantic States, made in 1897, shows the yield of carp from the coastal waters of these States to have been 1,333,263 pounds, valued at \$63,567, whereas in 1891 the catch amounted to only 46,798 pounds, worth \$1,715. More than half of the catch of carp in this region in 1897 was made in New Jersey, most of the fish being taken in partly brackish water. Complete returns respecting the interior waters now being investigated will probably show that the carp is entering largely into the food supply of the country.



## EASTERN OYSTERS IN SAN FRANCISCO BAY.

This industry has reached large proportions. From 1887 to 1900 more than 11,000 tons of eastern yearling seed oysters have been shipped to the bay of San Francisco and laid out for further growth. The time required for seed oysters to become marketable is from two to four years, according to the sizes demanded by Pacific Coast consumers. The beds of transplanted oysters occupy flats or tide lands and are exposed during the lowest tides. The areas where they are laid out are inclosed by fences of closely set stakes, which lessen the action of the waves in these shallows and keep out stingrays and other marauders. The value of the mature oysters sold is considerably over \$500,000 a year, the quantity and value being on the increase. An important fact in connection with the maturing of large quantities of eastern oysters in the bay is the extensive degree of propagation that has been going on. The writer has investigated this subject several times during the past ten years, finding each time evidences of greater natural increase.

For a number of years considerable quantities of oysters of volunteer growth have been picked at low tide from areas remote from the transplanted beds, and it has been ascertained that oystering of this character has been carried on without decreasing the supply.

Oyster spat from extensive planted beds along the west side of the bay drifts with the prevailing winds, toward the east side, where a very considerable set takes place, over an area more than 20 miles long.

Here there are broad stretches of shell banks of the small worthless native oyster of San Francisco Bay, upon the shells of which the young of the eastern oyster find lodgment. The strong winds of mid-summer create a heavy wave wash over the reefs, drifting the light shells of the natives and burying many of the eastern oysters growing among them. Fencing lessens the action of the waves and protects the interests of the owners. From a tract of 150 acres in this section of the bay, recently inclosed, over a million oysters were picked before any imported seed was laid out. It appears that the amount of spat set free from the transplanted beds is increasing, and the indications are that with the fencing in and planting of the shell banks of the east side the increment from natural propagation will grow in importance.

*Table showing the quantity of eastern seed oysters shipped to San Francisco Bay from 1887 to 1900.*

| Year.     | Pounds.   | Year.                      | Pounds.    |
|-----------|-----------|----------------------------|------------|
| 1887..... | 1,562,000 | 1895.....                  | 1,680,000  |
| 1888..... | 1,128,000 | 1896.....                  | 1,485,000  |
| 1889..... | 1,007,000 | 1897.....                  | 859,000    |
| 1890..... | 1,559,000 | 1898.....                  | 1,564,000  |
| 1891..... | 3,273,000 | 1899.....                  | 1,086,000  |
| 1892..... | 2,123,000 | 1900 (first 8 months)..... | 1,608,000  |
| 1893..... | 1,607,000 |                            |            |
| 1894..... | 1,332,000 | Total.....                 | 22,873,000 |

## THE LOBSTER FISHERY.

The lobster fishery is prosecuted to a greater or less extent in all the States on the Atlantic coast from Maine to Delaware, but nearly 75 per cent of the total annual yield is from the waters of Maine. The statistics show that the total yield in 1880 was 20,128,033 pounds, valued at \$488,871, and in 1889 it was 30,771,573 pounds, valued at \$861,297, an increase of 10,643,540 pounds in quantity and of \$372,426 in value. There has since been a great reduction in the quantity of lobsters annually produced, but the value has been constantly increasing. In 1898 the total yield was 15,188,062 pounds, valued at \$1,318,299, a decrease, as compared with 1889, of over 50 per cent in quantity and an increase of over 50 per cent in value. The greater part of this decrease in quantity has occurred in Maine and Massachusetts. From 1889 to 1898 the lobster yield of Maine declined about 55 per cent in quantity, while it increased about 70 per cent in value. In Massachusetts there has been an almost steady decline in the yield since 1880. In that year the catch was 4,315,416 pounds, valued at \$158,229, and in 1898 it was 1,693,741 pounds, valued at \$147,702, a decrease of 2,621,675 pounds, or 60 per cent in quantity, and of \$10,527, or about 6 per cent, in value.

The following table shows the quantity and value of lobsters taken in each of the lobster-producing States in each year for which this fishery has been investigated from 1880 to 1898:

| States.             | 1880.      |           | 1887.      |           | 1888.      |           |
|---------------------|------------|-----------|------------|-----------|------------|-----------|
|                     | Lbs.       | Value.    | Lbs.       | Value.    | Lbs.       | Value.    |
| Maine .....         | 14,234,182 | \$268,739 | 22,916,642 | \$512,044 | 21,694,731 | \$515,880 |
| New Hampshire ..... | 250,000    | 7,500     | 142,824    | 6,268     | 136,350    | 6,256     |
| Massachusetts ..... | 4,315,416  | 158,229   | 3,511,075  | 156,204   | 3,743,475  | 172,936   |
| Rhode Island .....  | 423,250    | 15,871    | 570,039    | 27,128    | 588,500    | 28,047    |
| Connecticut .....   | 613,385    | 23,002    | 1,487,020  | 82,594    | 1,477,226  | 85,723    |
| New York .....      | 135,000    | 5,062     | 114,000    | 6,850     | 248,000    | 13,900    |
| New Jersey .....    | 156,800    | 5,488     | 101,580    | 7,719     | 181,688    | 12,965    |
| Delaware .....      | -----      | -----     | 39,000     | 910       | 39,000     | 910       |

| States.             | 1889.      |           | 1890.   |          | 1891.   |          | 1892.      |           |
|---------------------|------------|-----------|---------|----------|---------|----------|------------|-----------|
|                     | Lbs.       | Value.    | Lbs.    | Value.   | Lbs.    | Value.   | Lbs.       | Value.    |
| Maine .....         | 25,001,351 | \$574,165 | -----   | -----    | -----   | -----    | 17,642,677 | \$663,048 |
| New Hampshire ..... | 137,175    | 6,415     | -----   | -----    | -----   | -----    | 196,350    | 11,700    |
| Massachusetts ..... | 3,353,787  | 148,492   | -----   | -----    | -----   | -----    | 3,182,270  | 205,638   |
| Rhode Island .....  | 456,000    | 21,565    | -----   | -----    | -----   | -----    | 774,100    | 53,762    |
| Connecticut .....   | 1,501,290  | 83,099    | -----   | -----    | -----   | -----    | 1,614,530  | 101,358   |
| New York .....      | 124,023    | 12,780    | 150,400 | \$14,754 | 165,093 | \$15,655 | -----      | -----     |
| New Jersey .....    | 188,347    | 14,301    | 185,321 | 13,683   | 165,664 | 12,463   | 143,905    | 10,861    |
| Delaware .....      | 9,600      | 480       | 7,200   | 360      | 8,200   | 410      | 5,600      | 285       |

| States.             | Fiscal year 1897. |           | Calendar year 1897. |          | 1898.      |           |
|---------------------|-------------------|-----------|---------------------|----------|------------|-----------|
|                     | Lbs.              | Value.    | Lbs.                | Value.   | Lbs.       | Value.    |
| Maine .....         | 10,300,880        | \$683,082 | -----               | -----    | 11,183,294 | \$992,855 |
| New Hampshire ..... | 90,300            | 5,493     | -----               | -----    | 108,515    | 9,372     |
| Massachusetts ..... | 2,089,502         | 157,330   | -----               | -----    | 1,693,741  | 147,702   |
| Rhode Island .....  | -----             | -----     | -----               | -----    | 578,066    | 43,290    |
| Connecticut .....   | -----             | -----     | -----               | -----    | 1,098,192  | 83,748    |
| New York .....      | 130,610           | 10,913    | 381,020             | \$31,458 | 332,378    | 30,235    |
| New Jersey .....    | 79,230            | 6,197     | 99,230              | 8,573    | 123,876    | 11,097    |
| Delaware .....      | -----             | -----     | 5,095               | 459      | -----      | -----     |

## THE PEARL FISHERY OF THE TUAMOTU ARCHIPELAGO.

During the voyage of the *Albatross* in the South Pacific Ocean in 1899, the writer made some investigations respecting the pearl fisheries of the Tuamotu Islands. This archipelago, more than 1,500 miles in length, consists of atolls, or low coral islands having large inclosed lagoons, within which the pearl fisheries are prosecuted.

The yield of pearl shell fluctuates according to the sections of the archipelago thrown open for pearl diving each year, and the methods of conducting the fishery have changed somewhat since it was investigated for the French Government, in 1884, by Mr. G. Bouchon-Brandeley. Until 1889 the pearl fisheries of the Tuamotus were free to all, and were participated in by both natives and whites, the latter as well as some of the natives employing diving suits. From 1890 to 1892 the use of diving apparatus was subject to special regulations, but since 1892 it has been prohibited, with the idea of restricting the taking of pearl shell and preserving the industry for the benefit of the native inhabitants.

Under present methods pearling is permitted each year in certain lagoons only, others being closed for periods of two or three years to permit the growth of shell. The different pearl-bearing lagoons are thus worked in succession. The diving season begins October 1, the natives concentrating at the most favorable places upon the official announcement of the list of islands to be fished. The industry employs about 20 small sail vessels and 600 boats or canoes.

The more important pearling islands are: Hiqueru, Hao, Raroia, Katiu, Takapoto, Ahe, Manihi, Apataki, Marutea, Aratika, Fakarava, Kaukura, Marokau, and Mangareva. Hiqueru is by far the most important of the group. It is worked at intervals of three years, its output of shell averaging over 250 tons per season. In 1896 the first month's diving produced about half the entire yield of the archipelago. Hao Island is next in importance for pearl shell. Pearls appear to be derived chiefly from Kaukura.

At the opening of the season of 1899 the *Albatross* called at Hiqueru, where over 3,000 persons were gathered, representing the majority of the pearling population of the Tuamotus. The bulk of the pearl shell was being taken from depths of 8 to 10 fathoms. Less than 25 per cent of the divers work at depths greater than 12 fathoms, while a few only can descend to 20 fathoms. When conditions are best, good divers earn \$2.20 to \$2.50 (Chilean silver) a week.

The industry here as elsewhere is based on pearl shell or mother-of-pearl, worth in the European market \$375 to \$800 per ton, according to the grade. Pearls when found are usually secreted by those discovering them, and disposed of privately. There are no statistics available respecting this feature of the fishery, although the total value of the pearls that come from the islands through various channels is known to be considerable.

The following statement respecting the quantity and value of mother-of-pearl shell from the Tuamotu Archipelago, exported from Tahiti during the period from 1873 to 1898 was secured with the assistance of Mr. J. L. Doty, consul of the United States at Tahiti:

*Quantity and value of mother-of-pearl shell from the Tuamotu Archipelago, exported from Tahiti from 1873 to 1898.*

| Year.     | Tons. | Value in United States coin. | Year.     | Tons. | Value in United States coin. |
|-----------|-------|------------------------------|-----------|-------|------------------------------|
| 1873..... | 328   | \$38,572.80                  | 1886..... | 162   | \$59,535.00                  |
| 1874..... | 410   | 150,597.00                   | 1887..... | 271   | 99,592.50                    |
| 1875..... | 240   | 95,080.00                    | 1888..... | 387   | 113,778.00                   |
| 1876..... | 390   | 76,340.00                    | 1889..... | 583   | 214,252.50                   |
| 1877..... | 234   | 57,330.00                    | 1890..... | 646   | 287,713.70                   |
| 1878..... | 591   | 173,654.00                   | 1891..... | 598   | 242,275.00                   |
| 1879..... | 470   | 138,180.00                   | 1892..... | 593   | 248,140.80                   |
| 1880..... | 281   | 82,614.00                    | 1893..... | 566   | 225,790.00                   |
| 1881..... | 502   | 196,784.00                   | 1894..... | 675   | 274,640.00                   |
| 1882..... | 471   | 207,711.00                   | 1895..... | 296   | 91,644.30                    |
| 1883..... | 384   | 169,344.00                   | 1896..... | 591   | 289,955.00                   |
| 1884..... | 343   | 134,456.00                   | 1897..... | 445   | 238,953.60                   |
| 1885..... | 249   | 75,407.00                    | 1898..... | 437   | 181,887.60                   |

A more extended account of the Tuamotu pearl fishery is being prepared, as the facts relating to it may prove of interest in connection with the pearl fishery of the Philippine Islands.

#### THE CHINESE SHRIMP FISHERY OF SAN FRANCISCO BAY.

The fishery for shrimps has been conducted in this bay for many years. The products are marketed fresh in California, or dried and exported to China, together with certain dried fish also yielded by the fishery. The industry is a declining one. When visiting the camps and fishing grounds in 1891 the writer counted 46 boats. The number from which licenses are collected at the present time is 31. The export of dried shrimps is decidedly less than in former years, while the quantity of dried fish exported is not great, the total amount from 1890 to 1898 being a little more than 3,600,000 pounds, or about equal to the export of shrimp products for any one year prior to 1894.

The following table shows the yield and value of the shrimp fishery in San Francisco Bay in 1889, 1890, 1891, 1892, 1895, and 1898, though the figures for 1898 are probably incomplete:

| Year.     | Pounds.   | Value.    |
|-----------|-----------|-----------|
| 1889..... | 5,522,104 | \$251,637 |
| 1890..... | 5,812,848 | 264,823   |
| 1891..... | 4,886,558 | 222,451   |
| 1892..... | 5,310,075 | 241,163   |
| 1895..... | 5,425,000 | 162,759   |
| 1898..... | 1,750,492 | 93,622    |

The following table shows the exports of dried shrimp, shrimp shells, and dried fish from 1890 to 1898.

Table showing the quantity of products of the Chinese shrimp fishery of San Francisco Bay exported to China during the period from 1890 to 1898.

| Months.   | 1890.   |         |                | 1891.   |           |                | 1892.   |         |                |
|-----------|---------|---------|----------------|---------|-----------|----------------|---------|---------|----------------|
|           | Fish.   | Shrimp. | Shrimp shells. | Fish.   | Shrimp.   | Shrimp shells. | Fish.   | Shrimp. | Shrimp shells. |
|           | Lbs.    | Lbs.    | Lbs.           | Lbs.    | Lbs.      | Lbs.           | Lbs.    | Lbs.    | Lbs.           |
| January   | 4,260   | 5,832   | 278,705        | 850     | 13,192    | 257,567        | 3,900   | 16,800  | 179,100        |
| February  | 8,403   | 8,789   | 843,215        | 8,567   | 39,736    | 790,788        | -----   | 33,400  | 679,500        |
| March     | 4,325   | 3,407   | 72,322         | 8,210   | 1,580     | 333,354        | 262,600 | 43,400  | 589,800        |
| April     | 13,181  | 17,792  | 58,530         | 57,537  | 83,329    | 235,313        | 3,560   | 83,000  | 304,800        |
| May       | 1,335   | 39,935  | 156,595        | 38,338  | 93,328    | 236,396        | 1,967   | 51,200  | 159,700        |
| June      | 138,737 | 208,310 | 417,172        | 231,489 | 91,750    | 285,127        | 81,200  | 79,000  | 262,800        |
| July      | 71,091  | 106,307 | 238,224        | 112,249 | 188,408   | 304,520        | 114,310 | 128,400 | 334,500        |
| August    | 87,579  | 131,240 | 82,977         | 69,105  | 104,919   | 38,753         | 100,200 | 80,400  | 174,300        |
| September | 24,184  | 116,785 | 12,620         | 77,542  | 210,306   | 39,153         | 104,800 | 168,600 | 59,400         |
| October   | 29,286  | 45,457  | 37,894         | 80,000  | 150,800   | 36,000         | 23,200  | 167,400 | 39,300         |
| November  | 8,921   | 95,339  | 7,600          | -----   | 23,800    | -----          | -----   | 77,000  | 17,100         |
| December  | -----   | 7,630   | -----          | 900     | 106,200   | 189,300        | 1,400   | 47,800  | 109,500        |
| Total..   | 391,302 | 786,823 | 2,205,854      | 684,787 | 1,107,348 | 2,746,271      | 697,077 | 976,400 | 2,909,800      |

| Months.   | 1893.   |         |                | 1894.   |         |                | 1895.   |         |                |
|-----------|---------|---------|----------------|---------|---------|----------------|---------|---------|----------------|
|           | Fish.   | Shrimp. | Shrimp shells. | Fish.   | Shrimp. | Shrimp shells. | Fish.   | Shrimp. | Shrimp shells. |
|           | Lbs.    | Lbs.    | Lbs.           | Lbs.    | Lbs.    | Lbs.           | Lbs.    | Lbs.    | Lbs.           |
| January   | -----   | 72,200  | 47,700         | -----   | 13,400  | 278,700        | -----   | 15,400  | 145,200        |
| February  | -----   | 2,000   | 491,100        | -----   | 6,800   | 243,600        | -----   | 15,800  | 96,000         |
| March     | -----   | 27,200  | 617,700        | -----   | 53,800  | 433,500        | -----   | 28,000  | 47,400         |
| April     | -----   | 50,600  | 166,200        | -----   | 57,400  | 210,300        | -----   | 63,000  | 104,400        |
| May       | -----   | 42,200  | 138,400        | -----   | 60,200  | 167,400        | 6,400   | 81,200  | 112,500        |
| June      | 120,400 | 69,400  | 175,200        | 76,600  | 60,400  | 175,800        | 26,400  | 82,000  | 185,100        |
| July      | 32,200  | 50,200  | 190,200        | 21,600  | 55,600  | 233,100        | 31,800  | 73,400  | 114,900        |
| August    | 36,800  | 50,600  | 241,200        | 71,400  | 40,800  | 112,500        | 1,200   | 83,800  | 170,700        |
| September | 8,600   | 81,800  | 207,000        | 207,200 | 63,400  | 17,400         | 4,600   | 88,800  | 80,700         |
| October   | -----   | 100,200 | 56,100         | 80,600  | 40,200  | 5,700          | 15,000  | 53,600  | 33,900         |
| November  | 600     | 53,000  | 53,700         | 55,600  | 116,200 | 6,600          | 83,600  | 119,000 | -----          |
| December  | 5,000   | 18,200  | 27,900         | -----   | 31,600  | -----          | 19,800  | 74,100  | -----          |
| Total..   | 203,600 | 617,600 | 2,412,400      | 513,000 | 599,800 | 1,884,600      | 188,800 | 773,100 | 1,090,800      |

| Months.   | 1896.   |           |                | 1897.   |         |                | 1898.   |         |                |
|-----------|---------|-----------|----------------|---------|---------|----------------|---------|---------|----------------|
|           | Fish.   | Shrimp.   | Shrimp shells. | Fish.   | Shrimp. | Shrimp shells. | Fish.   | Shrimp. | Shrimp shells. |
|           | Lbs.    | Lbs.      | Lbs.           | Lbs.    | Lbs.    | Lbs.           | Lbs.    | Lbs.    | Lbs.           |
| January   | 14,800  | 6,200     | -----          | 66,010  | 69,130  | 69,720         | 1,000   | 22,400  | 900            |
| February  | 15,400  | 308,200   | 16,500         | 900     | 82,125  | 167,000        | 900     | 40,400  | 1,200          |
| March     | 2,500   | 19,400    | 145,000        | 600     | 26,700  | 223,439        | 2,000   | 66,800  | 1,200          |
| April     | 47,200  | 77,400    | 179,700        | 183,899 | 9,400   | 100,755        | 55,000  | 55,000  | 1,500          |
| May       | 15,200  | 19,600    | 90,600         | 1,000   | 75,106  | 163,645        | 11,600  | 38,400  | 600            |
| June      | 54,400  | 44,600    | 64,800         | -----   | -----   | -----          | 90,000  | 86,200  | 3,000          |
| July      | 163,600 | 83,400    | 261,000        | 4,000   | 9,300   | 47,400         | -----   | -----   | -----          |
| August    | 46,600  | 96,000    | 59,400         | -----   | -----   | -----          | 90,600  | 98,800  | 1,200          |
| September | 10,800  | 85,600    | 37,800         | 3,600   | 99,800  | -----          | 19,600  | 86,400  | -----          |
| October   | 13,400  | 162,000   | 74,200         | 29,006  | 75,200  | 4,200          | 5,000   | 21,200  | 32,700         |
| November  | 15,600  | 70,000    | 27,300         | -----   | -----   | -----          | -----   | 11,000  | 1,000          |
| December  | 19,200  | 62,200    | 2,100          | 2,506   | 47,429  | 6,670          | -----   | 42,200  | 1,000          |
| Total..   | 418,700 | 1,034,600 | 958,400        | 291,521 | 494,190 | 782,829        | 275,700 | 568,800 | 44,300         |

There has been considerable local discussion respecting the bearing of the shrimp fishery upon the food of important fishes frequenting the same bay. The fishery can not be conducted successfully without the use of small-meshed nets, which involves the taking of the young of many species of fishes which are either themselves valuable fish or supposed to be the food of such species. Many of these are sculpins or other unimportant kinds. A careful search was made for young shad, salmon, and striped bass, but none were found. The food of the important fishes of this region is not yet well known.



Investigations of this subject by the writer in May and November revealed the presence of the following fishes in the shrimp nets as they came from the waters:

*List of fishes commonly taken in shrimp nets.*

| Food-fishes.                 |                     | Unimportant species.          |                       |
|------------------------------|---------------------|-------------------------------|-----------------------|
| Scientific name.             | Common name.        | Scientific name.              | Common name.          |
| Platichthys stellatus .....  | Flounder.           | Liparis pulchellus .....      | Sea snail.            |
| Parophrys vetulus .....      | Do.                 | Lampetra cibaria .....        | Lead-colored lamprey. |
| Psetichthys melanostictus .. | Do.                 | Siphostoma californiense ...  | Pipe-fish.            |
| Engraulis mordax .....       | California anchovy. | Pholis ornatus .....          | Butter-fish.          |
| Clupanodon cæruleus .....    | California sardine. | Leptocottus armatus .....     | Sculpin.              |
| Osmerus thaleichthys .....   | Smelt.              | Porichthys margaritatus ...   | Midshipman.           |
| Genyonemus lineatus .....    | Little roncador.    | Lepidogobius lepidus .....    |                       |
| Sebastes juv .....           | Rock-fish.          | Myliobatis californicus ..... | Sting ray.            |
| Cyprinus carpio .....        | Scale carp.         | Raia binoculata .....         | Skate.                |
| Microgadus proximus .....    | California tomcod.  | Notorhynchus maculatus ...    | Spotted shark.        |
| Cymatogaster aggregatus...   | Viviparous perch.   | Galeus californicus .....     | Hound-shark.          |
|                              |                     | Triakis semifasciatum .....   | Leopard-shark.        |
|                              |                     | Rhinotriacis henlei .....     | Small dog-shark.      |

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**A METHOD OF RECORDING EGG DEVELOPMENT,  
FOR USE OF FISH-CULTURISTS.**

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By CLAUDIUS WALLICH.

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In watching the development of fish embryos it is observed that the rate of growth of the embryo is dependent almost directly upon the temperature of the water. It has been customary to refer to the various stages of growth as making their appearance in a certain number of days or hours at a given mean water-temperature. As this mean is obviously subject to great variations, the lengths of time at which given phenomena appear are subject to correspondingly great variations. Then, too, in the embryonic life of each separate species of fish there are a number of definite periods that must be well known to the fish-culturist, for efficient work; such, for instance, as the beginning of the critical stage, the ending of the same, the earliest shipping age for eyed eggs, the latest shipping age for a given distance and conditions, the length of the incubation period, and the time required for sac absorption—all very important questions, concerning which accurate and immediate knowledge is often required. Again, the given mean water-temperature for the varying lengths of time at which these definite phenomena appear is not and can not well be computed until the phenomena have actually occurred, and it is therefore impossible to closely predict their time of occurrence.

The complexity of these data, as well as their importance, makes very desirable a simpler, more convenient, and more efficient terminology expressive of the rate of growth than the one above mentioned.

During the season of 1898 and 1899, at the United States Fish Commission station at Baird, Cal., there was tested a system of recording egg development which may be termed the "temperature or thermal unit system." By temperature unit (t. u.) is meant  $1^{\circ}$  F. above  $32^{\circ}$  for a period of 24 hours. Thus a mean temperature of  $36^{\circ}$  F. for one day is equivalent to 4 temperature units, etc. One degree centigrade for the same period would make a more convenient unit, as it would do away with the subtraction of 32 each day to find the resultant units; but as Fahrenheit thermometers were in general use the Fahrenheit scale was employed in this case.

To use this system of recording egg development, subtract 32 from the mean water-temperature of the day the first eggs are taken. This gives the age of the eggs in temperature units on the second day. The temperature units of the second day are added to those of the

first, and in this manner those of each succeeding day throughout the season are added to the total of the day previous. At a station where the temperature units are reckoned daily from the opening of the season the age of any lot of eggs may be at once known by subtracting from the reading on the day of examination the reading of the day on which the eggs were taken. In practice it is found simple and convenient, and as the season advances the answers to many questions may be had from this interesting column of figures.

The result of the tests at Baird shows that the incubation period of the quinnat salmon is about 900 t. u. From irregular data and some observation, it seems that this is also the number required for brook trout (*Salvelinus fontinalis*), while from similar data it is thought that rainbow trout (*Salmo irideus*) require a somewhat less number. Each species undoubtedly has its peculiar norm.

This unit seems preeminently to include the factors determining the length of the incubation period. Without going deeply into the merits of the old rule, "in 50 days at a mean water-temperature of 50° F. trout eggs will hatch, and for each degree warmer or colder 5 days less or more will be required, the difference, however, increasing the farther we recede from 50°," it will be seen at a glance that the law is an empirical one, and while recognizing perhaps the factors of incubation, it is not sufficiently accurate and explicit to be available in determining the entire period when the mean is slightly removed from 50° and is entirely silent as to intermediate stages. There are but two important variable factors that affect this period, namely, time and the temperature of the water. There are many other conditions that affect incubation, such as quality, volume, aeration, etc., conditions of such importance that success is not possible if they are not right, and these conditions must in some degree affect the length of the incubation period. The two main factors, however, as before stated, are time and the temperature of the water.

As water freezes at 32° F., and will, of course, congeal all life within it when frozen, rendering growth, if not life itself, impossible, it is only rational, so far as temperature is concerned, that this be the point of starting. In many stations, it is true, hatching operations are conducted in waters that are very cold, and it would seem that the eggs of *Salmonidæ* could hardly be subjected to as many as 900 t. u. before hatching. Cod work in winter time is also done at very low temperatures. It must be remembered, however, that the growth of the embryo salmonoid in such stations takes place mainly in the fall before the waters reach extremely low temperatures, and again in the spring when they begin to warm up. It is also conceded that cod work at 32° or 33° is very unsatisfactory.

It is hardly necessary to say that neither the "temperature-unit system," nor any other "system," will give uniform results in waters which through unsuitable temperatures will not produce healthy fry;



such, for example, as the extremely low temperatures in cod work and abnormally high temperatures for those species of *Salmonidæ* that naturally seek glacial waters for their spawning-grounds.

The accompanying extract from the temperature sheets of Baird Station shows the record of water-temperatures and the manner in which the age of the eggs was kept. It will be noticed that the daily mean is compiled from the morning and evening temperatures only, as by repeated trials they were shown to be the maxima and minima. It would have been better, perhaps, to have had readings every 3 hours, as the times during which these temperatures prevailed would have been more accurately gauged and a slightly different norm would probably have been found. The test, however, was thought to have been sufficiently thorough to show the value of the system.

*Extract from Baird water-temperature record.*

| Date.   | Temperature. |       |         |       | Temp. unit. | Date.   | Temperature. |       |         |       | Temp. unit. |
|---------|--------------|-------|---------|-------|-------------|---------|--------------|-------|---------|-------|-------------|
|         | 6 a. m.      | 12 m. | 6 p. m. | Mean. |             |         | 6 a. m.      | 12 m. | 6 p. m. | Mean. |             |
| 1898.   |              |       |         |       |             | 1898.   |              |       |         |       |             |
| Aug. 16 | 55           | 59    | 61      | 58    | -----       | Oct. 19 | 47           | 49    | 51      | 49    | 1322.5      |
| 17      | 54           | 60    | 60      | 57    | 26          | 20      | 46           | 49    | 51      | 48.5  | 1339.5      |
| 18      | 54           | 59    | 59      | 56.5  | 51          | 21      | 46           | 49    | 51      | 48.5  | 1356        |
| 19      | 53           | 59    | 59      | 56    | 75.5        | 22      | 46           | 49    | 51      | 48.5  | 1372.5      |
| Sept. 6 | 51           | 56    | 58      | 54.5  | 499         | 23      | 49           | 50    | 51      | 50    | 1389        |
| 7       | 52           | 56    | 57      | 54.5  | 521.5       | 24      | 47           | 48    | 50      | 48.5  | 1407        |
| 8       | 51           | 56    | 57      | 54    | 544         | 25      | 45           | 47    | 49      | 47    | 1423.5      |
| 9       | 51           | 56    | 57      | 54    | 566         | 26      | 46           | 48    | 49      | 47.5  | 1438.5      |
| 10      | 50           | 53    | 56      | 53    | 588         | 27      | 46           | 48    | 50      | 48    | 1454        |
| 11      | 50           | 53    | 55      | 52.5  | 609         | 28      | 45           | 48    | 50      | 47.5  | 1470        |
| 12      | 50           | 55    | 56      | 53    | 629.5       | 29      | 45           | 47    | 49      | 47    | 1485.5      |
| 13      | 50           | 54    | 55      | 52.5  | 650.5       | 30      | 46           | 48    | 50      | 48    | 1500.5      |
| 14      | 50           | 52    | 55      | 52.5  | 671         | 31      | 48           | 49    | 50      | 49    | 1516.5      |
| 15      | 50           | 54    | 56      | 53    | 691.5       | Nov. 1  | 46           | 48    | 49      | 47.5  | 1533.5      |
| 16      | 50           | 54    | 56      | 53    | 712.5       | 2       | 44           | 46    | 47      | 45.5  | 1549        |
| 17      | 50           | 53    | 55      | 52.5  | 733.5       | 3       | 45           | 46    | 47      | 46    | 1562.5      |
| 18      | 52           | 54    | 56      | 54    | 754         | 4       | 44           | 49    | 50      | 47    | 1576.5      |
| 19      | 51           | 54    | 56      | 53.5  | 776         | 5       | 46           | 49    | 50      | 48    | 1591.5      |
| 20      | 50           | 53    | 55      | 52.5  | 797.5       | 6       | 46           | 47    | 48      | 47    | 1607.5      |
| 21      | 51           | 52    | 53      | 52    | 818         | 7       | 44           | 46    | 47      | 45.5  | 1622.5      |
| 22      | 51           | 52    | 54      | 52.5  | 838         | 8       | 43           | 46    | 45      | 44    | 1636        |
| 23      | 50           | 53    | 54      | 52    | 858.5       | 9       | 42           | 44    | 45      | 43.5  | 1648        |
| 24      | 50           | 52    | 53      | 51.5  | 878.5       | 10      | 41           | 43    | 45      | 43    | 1659.5      |
| 25      | 50           | 52    | 53      | 51.5  | 898         | 11      | 42           | 44    | 45      | 43.5  | 1670.5      |
| 26      | 51           | 53    | 54      | 52.5  | 917.5       | 12      | 42           | 44    | 45      | 43.5  | 1682        |
| 27      | 51           | 53    | 55      | 53    | 938         | 13      | 42           | 44    | 45      | 43.5  | 1693.5      |
| 28      | 50           | 52    | 53      | 51.5  | 959         | 14      | 42           | 44    | 45      | 43.5  | 1705        |
| 29      | 48           | 51    | 52      | 50    | 978.5       | 15      | 42           | 44    | 45      | 43.5  | 1716.5      |
| 30      | 42           | 49    | 50      | 46    | 996.5       | 16      | 44           | 45    | 45      | 44.5  | 1728        |
| Oct. 1  | 45           | 47    | 49      | 47    | 1010.5      | 17      | 44           | 46    | 47      | 45.5  | 1740.5      |
| 2       | 46           | 48    | 49      | 47.5  | 1025.5      | Dec. 30 | 38           | 39    | 40      | 39    | 2208        |
| 3       | 47           | 49    | 49      | 48    | 1041        | 31      | 38           | 39    | 40      | 39    | 2215        |
| 4       | 48           | 49    | 50      | 49    | 1057        |         |              |       |         |       |             |
| 5       | 46           | 48    | 49      | 47.5  | 1074        | 1899.   |              |       |         |       |             |
| 6       | 48           | 49    | 51      | 49.5  | 1089.5      | Jan. 1  | 34           | 34    | 34      | 34    | 2222        |
| 7       | 49           | 50    | 50      | 49.5  | 1107        | 2       | 34           | 36    | 37      | 35.5  | 2224        |
| 8       | 48           | 50    | 51      | 49.5  | 1124.5      | Feb. 18 | 40           | 59    | 57      | 48.5  | 2696        |
| 9       | 49           | 51    | 51      | 50    | 1142        | 19      | 41           | 58    | 57      | 49    | 2712.5      |
| 10      | 49           | 51    | 52      | 50.5  | 1160        | 20      | 38           | 52    | 53      | 45.5  | 2729.5      |
| 11      | 50           | 53    | 53      | 51.5  | 1178.5      | 21      | 37           | 50    | 52      | 44.5  | 2743        |
| 12      | 49           | 53    | 52      | 50.5  | 1198        | 22      | 40           | 52    | 56      | 48    | 2755.5      |
| 13      | 49           | 52    | 54      | 51.5  | 1216.5      | 23      | 40           | 52    | 55      | 47.5  | 2771.5      |
| 14      | 49           | 51    | 52      | 50.5  | 1236        | 24      | 37           | 50    | 50      | 43.5  | 2787        |
| 15      | 48           | 51    | 51      | 49.5  | 1254.5      | 25      | 37           | 49    | 49      | 43    | 2798.5      |
| 16      | 49           | 51    | 51      | 50    | 1272        | 26      | 36           | 55    | 50      | 43    | 2809.5      |
| 17      | 46           | 49    | 50      | 48    | 1290        | 27      | 41           | 53    | 50      | 45.5  | 2820.5      |
| 18      | 46           | 49    | 51      | 48.5  | 1306        | 28      | 46           | 48    | 48      | 47    | 2834        |

In the table following is submitted a list of eggs hatched at Baird during the season of 1898-99, showing, for each lot of eggs, the date of taking, date of hatching, and number of days and number of tem-

perature units required for incubation. It will be noted that although the period of incubation varied from 48 to 90 days, yet the greater number of eggs hatched at very close to 900 t. u. The failure of a few lots to obey the general rule in most cases seemed to be due to some special cause, such as a sudden fall in temperature when near the hatching stage; for example, those hatching on January 8 and 13. Fry had already begun to appear at the top of the baskets before January 1, when a heavy snowstorm caused a drop of 5° in the temperature of the water and delayed hatching for several days. A sudden rise in temperature at hatching time also unduly accelerates hatching; note those hatched on February 19, 22, and 28; about this time abnormal variations of temperature prevailed, reaching a maximum difference between morning and noon of 19°.

*Record of eggs hatched at Baird, Cal., 1898-99.*

| When taken. | When hatched | Reading on day taken. | Reading on day hatched | Temperature units. | Days. | When taken. | When hatched | Reading on day taken. | Reading on day hatched | Temperature units. | Days. |
|-------------|--------------|-----------------------|------------------------|--------------------|-------|-------------|--------------|-----------------------|------------------------|--------------------|-------|
| 1898.       | 1898.        |                       |                        |                    |       | 1898.       | 1899.        |                       |                        |                    |       |
| Sept. 6     | Oct. 24      | 499                   | 1407                   | 908                | 48    | Nov. 17     | Feb. 14      | 1740.5                | 2645                   | 904                | 89    |
| 7           | 25           | 521.5                 | 1423.5                 | 902                | 48    | 18          | 14           | 1754                  | 2645                   | 891                | 88    |
| 8           | 27           | 544                   | 1454                   | 910                | 49    | 19          | 15           | 1767.5                | 2659                   | 891                | 88    |
| 10          | 30           | 588                   | 1500.5                 | 912                | 50    | 20          | 16           | 1782.5                | 2671                   | 888                | 88    |
| 11          | 31           | 609                   | 1516.5                 | 907                | 50    | 21          | 18           | 1795                  | 2696                   | 901                | 89    |
| 12          | Nov. 1       | 629.5                 | 1533.5                 | 904                | 50    | 22          | 18           | 1805.5                | 2696                   | 890                | 88    |
| 14          | 5            | 671                   | 1591.5                 | 920                | 52    | 24          | 19           | 1827.5                | 2712.5                 | 885                | 87    |
| 16          | 7            | 712.5                 | 1622.5                 | 910                | 52    | 25          | 19           | 1838.5                | 2712.5                 | 874                | 86    |
| 18          | 11           | 754                   | 1670.5                 | 916                | 54    | 26          | 20           | 1849                  | 2729.5                 | 880                | 86    |
| 22          | 17           | 838                   | 1740.5                 | 902                | 56    | 28          | 22           | 1869                  | 2755.5                 | 886                | 86    |
|             | 1899.        |                       |                        |                    |       | 29          | 22           | 1881.5                | 2755.5                 | 874                | 85    |
| Oct. 20     | Jan. 8       | 1339.5                | 2272.5                 | 933                | 80    | 30          | 24           | 1896.5                | 2787                   | 890                | 86    |
| 23          | 13           | 1389                  | 2315                   | 926                | 82    | Dec. 1      | 26           | 1910.5                | 2809.5                 | 899                | 87    |
| 27          | 16           | 1454                  | 2341.5                 | 887                | 81    | 2           | 27           | 1924.5                | 2820.5                 | 896                | 87    |
| 29          | 19           | 1485.5                | 2379.5                 | 894                | 82    | 3           | 28           | 1936.5                | 2834                   | 897                | 87    |
| 30          | 21           | 1500.5                | 2404.5                 | 904                | 83    | 4           | 28           | 1947.5                | 2834                   | 886                | 86    |
| 31          | 21           | 1516.5                | 2404.5                 | 888                | 82    | 5           | 28           | 1958                  | 2834                   | 876                | 85    |
| Nov. 1      | 24           | 1533.5                | 2440.5                 | 907                | 84    | 6           | Mar. 3       | 1969.5                | 2882.5                 | 913                | 87    |
| 5           | 28           | 1591.5                | 2489.5                 | 898                | 84    | 7           | 3            | 1980.5                | 2882.5                 | 902                | 86    |
| 6           | 29           | 1607.5                | 2503                   | 896                | 84    | 8           | 5            | 1991.5                | 2911.5                 | 920                | 87    |
| 7           | 30           | 1622.5                | 2516.5                 | 894                | 84    | 9           | 5            | 2001                  | 2911.5                 | 910                | 86    |
| *4          | 30           | 1576.5                | 2516.5                 | 940                | 87    | 10          | 5            | 2010                  | 2911.5                 | 901                | 85    |
| 8           | Feb. 4       | 1636                  | 2567.5                 | 931                | 88    | 15          | 7            | 2049                  | 2943                   | 894                | 82    |
| 10          | 5            | 1659.5                | 2570                   | 910                | 87    | 16          | 8            | 2059.5                | 2959.5                 | 900                | 82    |
| 11          | 6            | 1670.5                | 2573                   | 902                | 87    | 17          | 10           | 2069.5                | 2983.5                 | 914                | 83    |
| 12          | 9            | 1682                  | 2593                   | 911                | 89    | 20          | 11           | 2106                  | 2992                   | 886                | 81    |
| 13          | 11           | 1693.5                | 2612.5                 | 919                | 90    | 18          | 12           | 2080.5                | 3008                   | 927                | 84    |
| 14          | 12           | 1705                  | 2623.5                 | 918                | 90    | 22          | 13           | 2129                  | 3021                   | 892                | 81    |
| 15          | 12           | 1716.5                | 2623.5                 | 907                | 89    | 27          | 17           | 2176                  | 3076.5                 | 900                | 80    |

\* Very few eggs in this basket. Hatching always seems slower with a single layer of eggs than in full baskets; probably less animal heat.

The main advantage of this system of recording egg development lies in the fact that information is secured at a time when it is needed. By this it is not intended that entire reliance should be placed upon the record for determining the condition of the eggs. On the contrary, the chief dependence should always be placed on their appearance, especially in determining how far along they are in the tender stage and when they are well out of the same. The information obtained from the record is corroborative of our work and enables it to be checked up. For example, when selecting eggs for shipment a

short calculation will tell just what eggs are most suitable. Suppose a foreign shipment requiring a two or three weeks' journey is to be made. It is desirable to select the oldest eggs that will arrive before hatching, with a margin for safety besides. By estimating the probable temperature of the package, the number of temperature units required for the journey can be readily computed. Thus, if the temperature of the package be maintained at about 50° F., in 20 days it will be subjected 20 times 18, or 360 t. u., and if 100 t. u. be allowed for excess in temperature or delay on the journey a total of 460 t. u. is required. By subtracting these 460 t. u. from 900 t. u. it is seen that eggs of an age of 440 t. u. are required—so young that the eye-spot is barely visible when viewed in the ordinary way, but old enough to stand shipment. If this 440 t. u. be now subtracted from the reading on the day of shipment, the remainder corresponds to the reading of the day on which the required eggs were taken. Eggs for long foreign shipments are especially difficult to select, and any evidence corroborative of the exact age of the eggs at a time when mistakes are particularly to be avoided is very gratefully received.

In handling quinnat-salmon eggs at Baird Station it is safe and practical to pick them till they have an age of 100 t. u., when they are carefully picked for the last time before entering the tender stage. It is not thought that the entrance on this stage involves any sudden transformation, but the eggs are believed to increase daily in sensitiveness from the time they are taken until a time when, with the apparatus employed, it is no longer safe to handle them. After entering the tender stage they are left undisturbed until the germ disk has completed its growth around the egg. In the "summer run" eggs this occurred very close to 225 t. u. At this time it was found safe to uncover them; that is, to raise the baskets gently until the contained eggs are near the surface of the water and then suddenly, but carefully, to lower it, thus forcing the water up through the eggs and removing any accumulations of sediment that may have been deposited upon them, until they are clean or nearly so. Sediment usually collects only upon the upper layer of eggs. In performing this operation care must be taken to allow all the eggs to settle before it is repeated. After they have been treated in this manner for several days and have an age of about 300 t. u., they are quite out of the tender stage and may be subjected to daily pickings, the same as older eggs.

In observing eggs from time to time while in the tender stage the most striking phenomenon and the one most readily seen with the unaided eye is the ring or loop which defines the germinal layer in its growth around the egg. This ring is visible to the unaided eye as early as the sixth day, at 57° F., or at an age of 125 t. u., as seen in fig. 6 of the accompanying sketches, when it is apparently not yet fully formed. It retains its circular shape until it passes the equa-

torial position, which occurs on the eighth day, at 57° F., or 175 t. u., after which it gradually assumes a loop-like or pear-shaped form while traversing the lower hemisphere. This shape becomes the more pronounced the more nearly it approaches closure. This thickened blastodermic ring is the seat of the greatest vital activity in the layer, and any shock sufficient to cause the death of the egg first manifests its effects in the whitening of the ring and its surrounding tissue. The distinct outline of the fish is first seen when the ring is well down to the equator of the egg. This appearance of the outline of the fish, however, does not indicate that the tender stage is passed, for it is seen that a rupture of the germinal layer is quite fatal and is liable to occur until the egg is completely enveloped and some little time has elapsed to allow for the hardening or toughening of the layer.

The experiment that seemed to force the above conclusions consisted in taking a few eggs at a time and allowing them to fall from different elevations upon the canvas trough-covers, after which they were at once replaced in the water. Death following a severe jar for a given stage was indicated by an almost immediate whitening of the egg, but in the case of a less severe jar this clouding of the substance of the egg took place only after the lapse of several hours.

During the entire summer run of 1898 the blastopore closed, with very slight variations, at 225 t. u. When, on examining the eggs, it was found necessary to uncover a new lot, the record was always first consulted to find the age in temperature units, and the uniformity of the record in this respect established the fact that the ring closed at 225 t. u. However, when it came to the fall run, with its colder water, it was found that the same phenomenon occurred at 250 t. u., and this number was likewise uniform for the entire fall run; but as fall-run eggs, with but few exceptions, hatched at as close to 900 t. u. as did the summer-run eggs, it must be concluded either that up to a certain period of its growth the progress of the embryo is more rapid (when measured in temperature units) in warmer temperatures than in colder ones, or else it might be considered a point in favor of the argument that the spring and fall runs are made by distinct and separate varieties of fish. The former is probably the case, as the slight variations observed in a long summer-run series seem to point that way.

In attempting a description of the accompanying sketches of salmon embryos one is almost necessarily restricted to terms that are not always scientific. Phenomena that appear to the unaided eye in the entire egg are often quite different from the real biological changes taking place in the egg and which can only be seen by means of sections and a high-power microscope. Thus, when reference is made to the "nucleus," the dark central spot or kernel that is visible to the unaided eye is intended. The true nucleus is microscopic in size and is situated in the upper part of the germ disk, where, after the

two processes of cell division resulting in the extrusion of the polar bodies, it unites with the male nucleus derived from the spermatozoon, which in the meantime has entered the egg through the micropyle, has become embedded in the germ disk, and has separated into a nucleus and its accompanying aster. The union of these two nuclei and the formation of an aster inaugurate the process of segmentation. All these processes are microscopic, and not even a suggestion of what is taking place could be inferred from the external appearance.

These sketches are intended simply to give an idea of what can be seen with the unaided eye during the tender stage; and as landmarks showing progress in that stage it is hoped that they may be of some practical value. They show stages in the growth of summer-run quinnat-salmon eggs with the water at a mean temperature of 57° F. Sketches were made daily, and the age of the stage in temperature units was noted. As the water grew colder, it was noticed that while it sometimes took several days longer to reach a certain stage, yet the number of temperature units was always, within narrow limits, the same for a given stage. This uniformity of results at the given stages is the feature of the system that seems most strongly to recommend it for general use, and while different stations, with their differing conditions of water and weather, may produce slightly different results, still, as the conditions at any one station, year in and year out, are the same, the resultant differential will be the same.

Fig. 1 represents the egg about 1½ hours after impregnation and shows the concentration of minute vesicles at the pole; also their general distribution over the entire surface of the egg. They are quite sparsely scattered, however, and soon draw up into the upper third of the egg. A bluish translucent substance occupies the upper quarter of the egg, always rising to the top as the egg is turned. As no microscopic work was done at this time, this substance can not be positively named, but it is believed to be the germ disk attached to the inner egg or yolk mass, the whole inner egg turning with the disk. The eggs are extremely slippery when young. This quality is retained until they enter the tender stage, but is lost before they emerge from it.

Fig. 2 represents the egg 1 day old at a mean water-temperature of 57° F., or at an age of 25 t. u. It shows a distinct "nucleus" surrounded by a clouded band of very minute vesicles. The width of this band is about equal to the diameter of the nucleus. Around it are vesicles which extend down to about one-third the depth of the egg.

Fig. 3 is very similar to Fig. 2, the nucleus and band being larger. It represents 2 days' growth at the same water-temperature, or an age of 50 t. u.

Fig. 4 shows a partial clearing up of the clouded band; also a diminution in the size of the central nucleus. Age, 3 days at 57° F. mean temperature, or 7½ t. u.



Fig. 5 shows the egg 4 days old. Central area clearer than at 3 days.

Fig. 6 represents the egg at 5 days old, or an age of 125 t. u., and shows now for the first time the presence of a secondary ring, not quite complete, with vesicles on both sides of it. The inner ring is of about the same appearance as on the day previous. This secondary "ring" is the outer edge of the germ disk or blastoderm and forms the margin of the blastopore.

Fig. 7 shows the egg with 6 full days' growth at 57° F., or 150 t. u. The blastoderm is now well developed and has grown sufficiently to pass the zone of vesicles. It is a very interesting as well as very delicate stage of the egg. Phenomena appear that are not seen the day previous nor the day following. It is at this time that the laying of the "neural keel" or forming of the body outline of the fish takes place. This outline can be quite readily detected the following day at the same water-temperature.

Fig. 8 represents the growth of the germinal layer halfway down the egg. Its edge, previously referred to as forming the "ring" or "loop" or blastopore, has the appearance of an addled ring. The body outline of the fish is now seen for the first time, the tail extending down to the edge of the ring. The relative positions of the tail of the fish and the ring do not change. The edge of the germ disk, in its further growth finally encircling the egg, seems to remain attached at this point and closes up in the shape of a continuously diminishing loop, disappearing after the tenth day at 57° F.

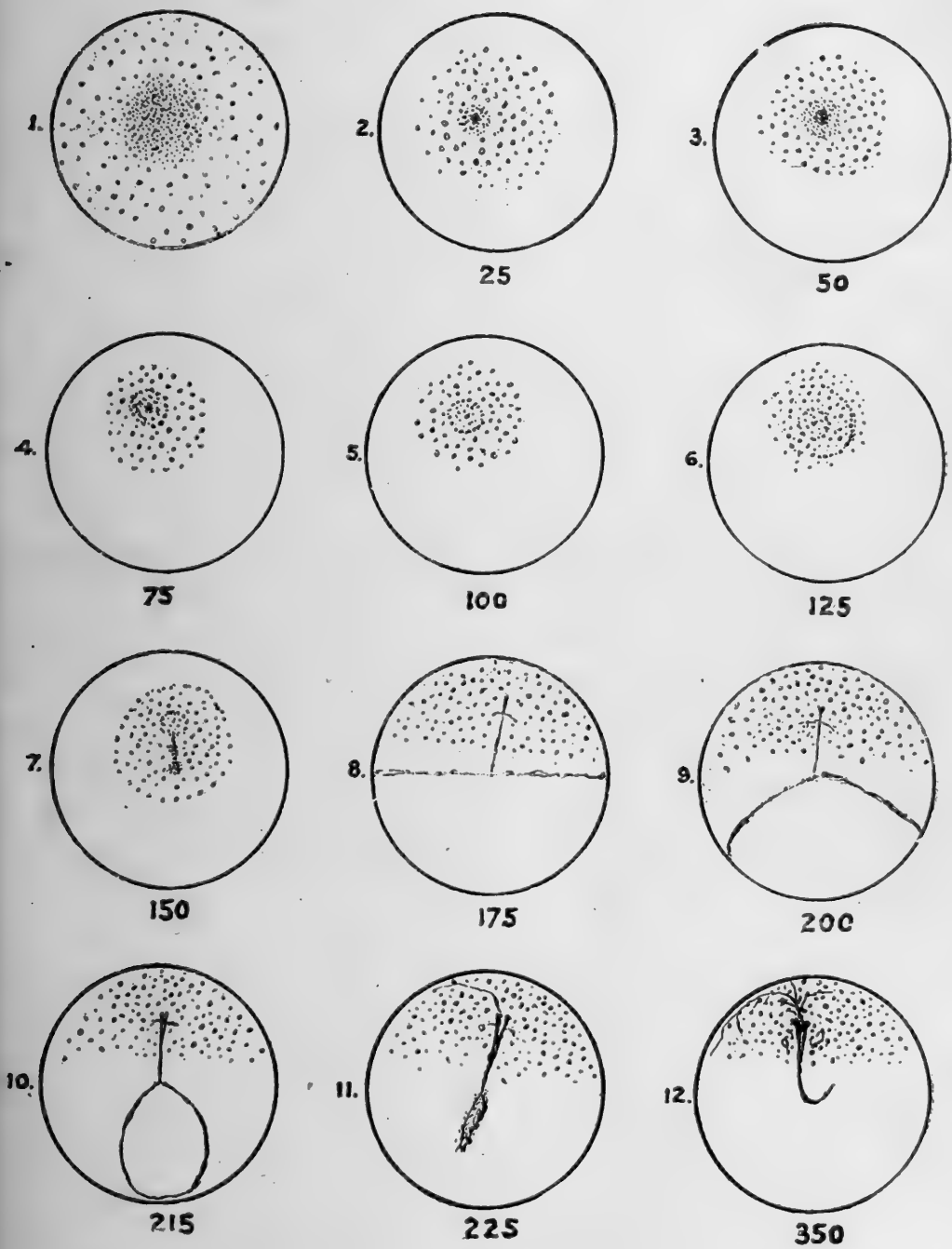
Fig. 9, at 200 t. u., shows a partial closing of the loop and a faint differentiation of the head into two eye-spots; also the appearance of a line crossing the body back of the head, which in a few days seems to deflect from this position and extend out forward. This line finally branches out and assumes the bright color of an artery.

Fig. 10, at 8½ days old, or an age of 215 t. u., shows the loop distinctly as such. Body outline clearer.

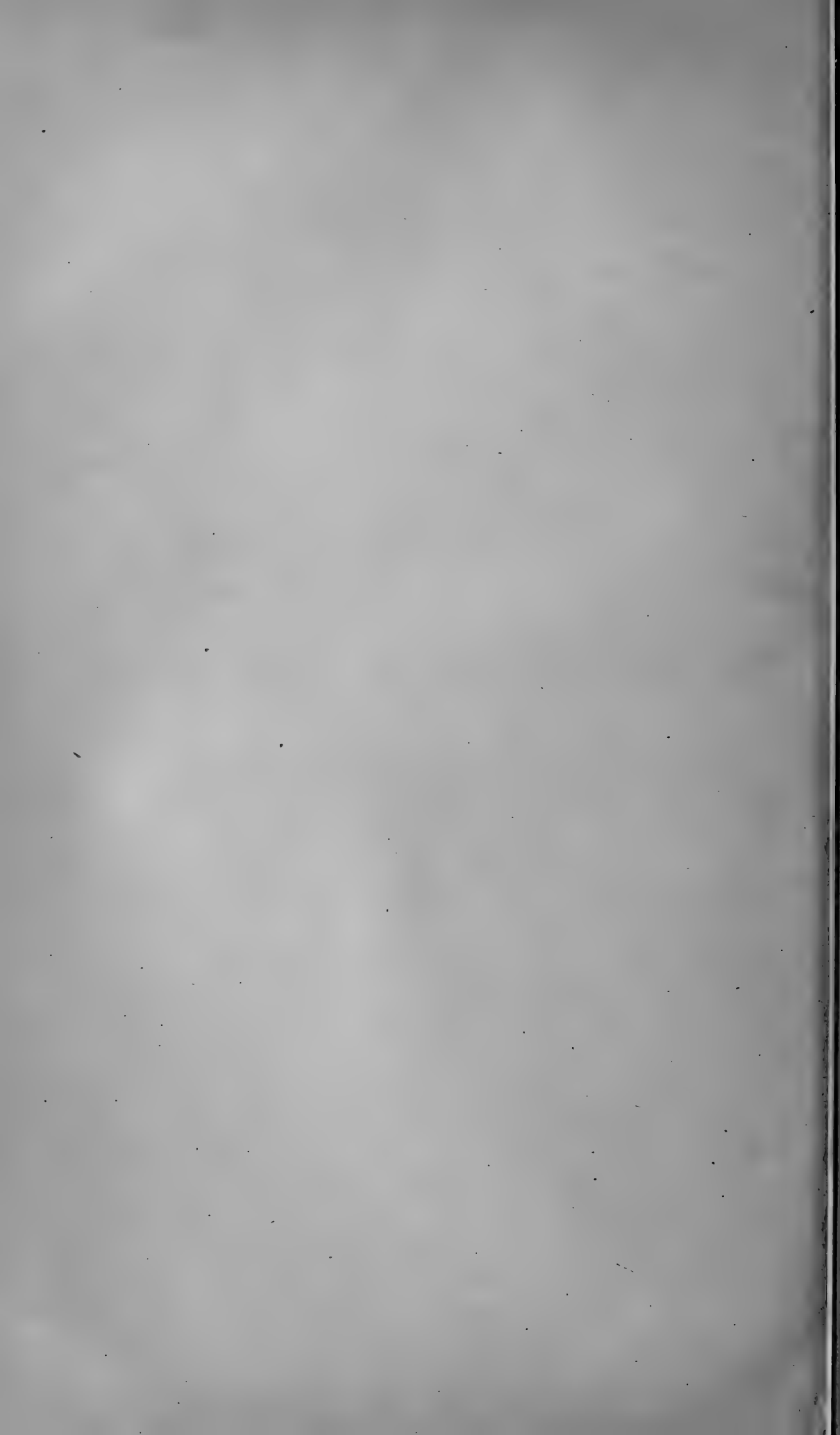
Fig. 11 shows the egg on the tenth day, or 9 full days old, 225 t. u. The loop is closed, and its remains may be seen hanging to the tail of the fish. The artery may now be seen extending out from the head, although it has not yet assumed its bright-red color. The fish is now practically formed, though the germ layer is still quite tender and liable to rupture.

One of the commonest monstrosities among young salmon is that of tailless fish; and as this thickened blastodermic ring forms the caudal plate, it is thought that an injury to the embryo caused by rough treatment at this time may be responsible for the loss.

Fig. 12 shows the egg at 14 days old, or 350 t. u. The artery projecting out from the head has assumed color, the tail is bent upward, and the fish is capable of motion. It is now well out of the tender stage, and must be kept free and clean to insure that degree of aeration which the increasing color of the artery shows that it requires.



EMBRYOS OF THE QUINNAT SALMON (SUMMER RUN).



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# STATISTICS

OF THE

## FISHERIES OF THE MIDDLE ATLANTIC STATES.

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PREPARED IN THE DIVISION OF STATISTICS AND METHODS OF THE  
FISHERIES, UNITED STATES FISH COMMISSION.

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C. H. TOWNSEND, ASSISTANT IN CHARGE.

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## INTRODUCTORY NOTE.

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The following report on the fisheries of the Middle Atlantic States has been prepared from data collected by agents of this Commission in 1898 and 1899, the information relating to the year 1897, with supplementary statistics on New York and New Jersey for 1898.

The statistics presented for the various States of this region relate wholly to the commercial fisheries of the coastal waters, in which are included the lower sections of the coast rivers. The fisheries of the interior waters have not been considered.

The general results of this work have already been published in Statistical Bulletins Nos. 11. and 13, and in the report of the Commissioner for 1899.

The report has been prepared under the direction of Mr. C. H. Townsend, assistant in charge of the division of fisheries.

The inquiries in the field were made by agents of the division, as follows: C. H. Stevenson in Maryland and New York; W. A. Wilcox in Virginia; T. M. Cogswell in Virginia and Maryland; Ansley Hall in Virginia, Maryland, Delaware, and New Jersey; John N. Cobb in Maryland, Delaware, Pennsylvania, and New Jersey; W. A. Roberts in Virginia, Maryland, and New Jersey; and E. S. King in Maryland, Delaware, and Pennsylvania.

Mr. Townsend spent a few days in visiting certain fisheries in New Jersey and New York, and Mr. J. B. Wilson was employed temporarily in Virginia and New York.

The field agents have assisted in the preparation of the statistical tables and have made contributions to the explanatory notes relating to the States canvassed by them.

GEO. M. BOWERS, *Commissioner.*



## STATISTICS OF THE FISHERIES OF THE MIDDLE ATLANTIC STATES.

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### GENERAL NOTES AND STATISTICS.

The number of persons engaged in the coast fisheries of the Middle Atlantic States in 1897 was 95,316. Of this number, 73,169 were fishermen and 22,147 shoresmen. The States which had the greatest number of persons employed in their fisheries were Maryland and Virginia, the former having 42,812 and the latter 28,277. New Jersey comes third, with 12,494, followed by New York with 7,443, Delaware with 2,392, and Pennsylvania with 1,898. Since the general canvass of the fisheries of this region in 1891 there has been an increase in the number of persons employed of 5,808. This increase has taken place in four of the States here considered, while in two States there have been decreases. The largest increase has occurred in Virginia, amounting to 4,682 persons.

The capital invested in the fisheries of the region amounted to \$15,-188,615. In Maryland the investment was \$5,821,610; in Virginia, \$2,891,536; in New Jersey, \$2,371,253; in New York, \$2,094,869; in Pennsylvania, \$1,601,528, and in Delaware, \$407,819. As compared with the year 1891 the capital invested in the fisheries is shown to have increased \$787,807, the increase being largest in New York.

The number of vessels employed was 3,874, having a tonnage of 58,315 tons, and a value, with their outfits, of \$4,167,469. The boats employed in the shore fisheries numbered 32,290, and were valued, with accessory scows and floats, at \$1,875,965. The apparatus of capture was valued at \$1,515,723. The value of shore property and cash capital was \$7,629,458.

The products of the fisheries, aggregating 594,172,210 pounds, were valued at \$14,324,463. This amount is apportioned as follows: Maryland, \$3,617,306; New Jersey, \$3,614,434; New York, \$3,391,595; Virginia, \$3,179,498; Pennsylvania, \$269,507, and Delaware, \$252,123. The oyster fishery, which is the most important in this region, was valued at \$8,866,829. The shad fishery ranks next in importance, being valued at \$981,246. The clam fishery was valued at \$937,872. Other important species were blue-fish, valued at \$581,563; menhaden, at \$473,359; squeteague, at \$380,371; crabs, at \$337,264, and alewives, at \$229,983.

The fishery products since 1891 have increased 3,717,841 pounds in quantity and have decreased \$4,699,011 in value. The States which show an increase in the quantity of their products are New Jersey, Delaware, and Virginia, while there has been a decrease in value in all of the States except New Jersey. It is interesting to note that the yield of shad, a species which has been the subject of extensive artificial propagation in this region, has increased 5,655,151 pounds in quantity and has decreased \$235,343 in value. The yield of cod has increased 2,480,537 pounds and \$25,205 in value. The cod has also been extensively planted in the inshore waters north of this region.

In making comparisons of the present condition of the fisheries of this region with their condition in former years, the following earlier publications of the United States Fish Commission may be consulted advantageously:

The Fishery Industries of the United States, section II. Geographical Review of the Fisheries for 1880. Parts VI to XI, inclusive.

The Fishery Industries of the United States, section V. History and Methods of the Fisheries.

A Statistical Report on the Fisheries of the Middle Atlantic States, by Hugh M. Smith, M. D. Bull. U. S. Fish Com. 1894, pp. 339-467.

The Oyster Industry of Maryland, by Charles H. Stevenson. Bull. U. S. Fish Com. 1892, pp. 203-297.

The Sturgeon and Sturgeon Industries of the Eastern Coast of the United States, by John A. Ryder. Bull. U. S. Fish Com. 1888, pp. 231-328.

The Sturgeon Fishery of Delaware River and Bay, by John N. Cobb. Rept. U. S. Fish Com. 1899, pp. 369-380.

Notes on the Oyster Industry of New Jersey, by Ansley Hall. Rept. U. S. Fish Com. 1892, pp. 463-528.

The Shad Fisheries of the Atlantic Coast of the United States, by Charles H. Stevenson. Rept. U. S. Fish Com. 1898, pp. 101-269.

Notes on the Extent and Condition of the Alewife Fisheries of the United States in 1896, by Hugh M. Smith. Rept. U. S. Fish Com. 1898, pp. 31-43.

The three following tables show in detail the number of persons employed, capital invested, and the quantity and value of the products in 1897:

*Table showing the number of persons engaged in the fisheries of the Middle Atlantic States in 1897.*

| States.            | Fisher-<br>men. | Shores-<br>men. | Total. |
|--------------------|-----------------|-----------------|--------|
| New York .....     | 6,937           | 506             | *7,443 |
| New Jersey .....   | 11,884          | 610             | 12,494 |
| Pennsylvania ..... | 1,461           | 437             | 1,898  |
| Delaware .....     | 2,008           | 384             | 2,392  |
| Maryland .....     | 26,627          | 16,185          | 42,812 |
| Virginia .....     | 24,252          | 4,025           | 28,277 |
| Total .....        | 73,169          | 22,147          | 95,316 |

\*Exclusive of persons engaged in the wholesale trade of New York city.

Table showing the investment in the fisheries of the Middle Atlantic States in 1897.

| Items.                               | New York. |           | New Jersey. |           |
|--------------------------------------|-----------|-----------|-------------|-----------|
|                                      | No.       | Value.    | No.         | Value.    |
| Vessels.....                         | 643       | \$810,575 | 675         | \$649,451 |
| Tonnage.....                         | 9,664     |           | 8,452       |           |
| Outfit.....                          |           | 201,075   |             | 117,393   |
| Boats.....                           | 4,089     | 267,181   | 6,365       | 485,059   |
| Scows, floats, etc.....              |           | 7,160     |             |           |
| Seines.....                          | 179       | 26,810    | 522         | 39,894    |
| Gill nets.....                       | 3,169     | 65,187    | 4,142       | 124,158   |
| Pound nets, traps, and weirs.....    | 197       | 53,780    | 180         | 98,995    |
| Fyke nets.....                       | 3,487     | 17,195    | 2,556       | 16,438    |
| Stop nets.....                       |           |           | 82          | 5,178     |
| Dip nets.....                        | 13        | 7         |             |           |
| Lines.....                           |           | 6,763     |             | 6,385     |
| Pots, eel and lobster.....           | 8,940     | 10,992    | 4,484       | 5,176     |
| Dredges, tongs, rakes, and hoes..... |           | 32,658    |             | 83,966    |
| Crab scrapes or dredges.....         |           |           | 144         | 612       |
| Other apparatus.....                 |           | 56        |             | 1,156     |
| Shore and accessory property.....    |           | * 437,930 |             | 563,992   |
| Cash capital.....                    |           | * 157,500 |             | 173,400   |
| Total.....                           |           | 2,094,869 |             | 2,371,253 |

| Items.                               | Pennsylvania. |           | Delaware. |          |
|--------------------------------------|---------------|-----------|-----------|----------|
|                                      | No.           | Value.    | No.       | Value.   |
| Vessels.....                         | 40            | \$71,200  | 42        | \$32,375 |
| Tonnage.....                         | 757           |           | 554       |          |
| Outfit.....                          |               | 20,555    |           | 5,479    |
| Boats.....                           | 504           | 21,485    | 953       | 39,349   |
| Seines.....                          | 125           | 12,921    | 176       | 8,676    |
| Gill nets.....                       | 177           | 9,711     | 983       | 31,037   |
| Pound nets, traps, and weirs.....    |               |           | 8         | 625      |
| Fyke nets.....                       | 1,120         | 1,508     | 656       | 1,125    |
| Dip nets.....                        | 110           | 320       |           |          |
| Lines.....                           |               | 172       |           | 101      |
| Pots, eel and lobster.....           | 125           | 90        | 677       | 354      |
| Dredges, tongs, rakes, and hoes..... |               | 2,500     |           | 3,725    |
| Other apparatus.....                 |               | 390       |           | 399      |
| Shore and accessory property.....    |               | 828,576   |           | 196,374  |
| Cash capital.....                    |               | 632,100   |           | 88,200   |
| Total.....                           |               | 1,601,528 |           | 407,819  |

| Items.                               | Maryland. |             | Virginia. |           | Total. |             |
|--------------------------------------|-----------|-------------|-----------|-----------|--------|-------------|
|                                      | No.       | Value.      | No.       | Value.    | No.    | Value.      |
| Vessels.....                         | 1,419     | \$1,078,560 | 1,055     | \$675,862 | 3,874  | \$3,318,023 |
| Tonnage.....                         | 23,670    |             | 15,218    |           | 58,315 |             |
| Outfit.....                          |           | 265,982     |           | 238,962   |        | 849,446     |
| Boats.....                           | 10,077    | 562,455     | 10,302    | 493,276   | 32,290 | 1,868,805   |
| Scows, floats, etc.....              |           |             |           |           |        | 7,160       |
| Seines.....                          | 330       | 39,282      | 145       | 54,012    | 1,477  | 181,595     |
| Gill nets.....                       | 8,464     | 77,264      | 9,307     | 46,235    | 26,242 | 353,592     |
| Pound nets, traps, and weirs.....    | 856       | 81,115      | 1,250     | 264,600   | 2,491  | 499,115     |
| Fyke nets.....                       | 7,117     | 23,108      | 361       | 4,687     | 15,297 | 64,061      |
| Stop nets.....                       |           |             |           |           | 82     | 5,178       |
| Dip nets.....                        |           |             |           |           | 123    | 327         |
| Trammel nets.....                    | 31        | 2,320       |           |           | 31     | 2,320       |
| Slat traps.....                      |           |             | 68        | 1,345     | 68     | 1,345       |
| Lines.....                           |           | 2,238       |           | 1,632     |        | 17,291      |
| Pots, eel and lobster.....           | 4,910     | 2,546       | 270       | 404       | 19,406 | 19,562      |
| Dredges, tongs, rakes, and hoes..... |           | 155,464     |           | 75,804    |        | 354,117     |
| Crab scrapes or dredges.....         | 2,806     | 10,294      | 826       | 2,063     | 3,776  | 12,969      |
| Other apparatus.....                 |           | 2,028       |           | 222       |        | 4,251       |
| Shore and accessory property.....    |           | 1,878,669   |           | 607,682   |        | * 4,513,223 |
| Cash capital.....                    |           | 1,640,285   |           | 424,750   |        | * 3,116,235 |
| Total.....                           |           | 5,821,610   |           | 2,891,536 |        | 15,188,615  |

\* Exclusive of the shore property and cash capital in the wholesale trade of New York city.

Table showing the quantity and value of products taken in the fisheries of the Middle Atlantic States in 1897.

| Species.                  | New York.   |           | New Jersey. |           | Pennsylvania. |         | Delaware. |          |
|---------------------------|-------------|-----------|-------------|-----------|---------------|---------|-----------|----------|
|                           | Lbs.        | Value.    | Lbs.        | Value.    | Lbs.          | Value.  | Lbs.      | Value.   |
| Alewives.....             | 955,000     | \$11,367  | 2,053,802   | \$9,529   | 422,335       | \$2,883 | 1,924,607 | \$11,910 |
| Black bass.....           |             |           | 150         | 12        | 4,103         | 418     |           |          |
| Blue-fish.....            | 11,146,424  | 391,027   | 5,164,173   | 148,257   | 12,800        | 321     |           |          |
| Bonito.....               | 42,823      | 2,103     | 358,700     | 9,605     |               |         |           |          |
| Butter-fish.....          | 728,616     | 26,125    | 217,057     | 5,867     |               |         |           |          |
| Carp.....                 | 205,560     | 8,318     | 785,409     | 39,370    | 114,950       | 6,695   | 111,300   | 5,192    |
| Cat-fish.....             | 90,090      | 5,656     | 221,985     | 11,114    | 120,096       | 6,985   | 68,290    | 3,847    |
| Cero.....                 |             |           | 5,100       | 160       |               |         |           |          |
| Cod.....                  | 2,116,316   | 69,879    | 3,481,890   | 71,208    |               |         |           |          |
| Croakers.....             |             |           | 280,800     | 5,021     |               |         | 297,600   | 2,554    |
| Drum.....                 |             |           | 82,900      | 842       |               |         |           |          |
| Eels.....                 | 420,730     | 29,226    | 749,405     | 35,862    | 51,794        | 4,273   | 128,810   | 6,352    |
| Flounders.....            | 1,108,057   | 35,174    | 1,225,725   | 29,018    | 31,545        | 792     | 2,000     | 85       |
| Haddock.....              | 153,320     | 4,904     | 167,375     | 3,060     |               |         |           |          |
| Hake.....                 | 24,300      | 608       | 69,735      | 1,538     |               |         |           |          |
| Hickory shad.....         |             |           | 3,719       | 229       |               |         |           |          |
| King-fish.....            | 10,440      | 872       | 43,027      | 3,766     |               |         |           |          |
| Mackerel.....             | 140,812     | 6,978     | 24,300      | 1,628     |               |         |           |          |
| Menhaden.....             | 60,605,712  | 147,697   | 30,552,825  | 70,056    |               |         |           |          |
| Mullet.....               |             |           | 22,075      | 537       |               |         | 37,700    | 844      |
| Perch, white.....         | 62,490      | 3,244     | 596,917     | 37,924    |               |         | 399,300   | 19,128   |
| Perch, yellow.....        | 3,100       | 121       | 5,960       | 297       |               |         |           |          |
| Pike and pickerel.....    |             |           | 2,770       | 152       |               |         | 41,250    | 2,027    |
| Pollock.....              | 3,000       | 90        | 300         | 9         |               |         |           |          |
| Pompano.....              |             |           | 40          | 10        |               |         |           |          |
| Scup.....                 | 746,373     | 16,911    | 757,450     | 13,816    | 29,150        | 719     |           |          |
| Sea bass.....             | 354,441     | 16,245    | 2,131,480   | 74,281    | 900,000       | 36,000  | 1,900     | 95       |
| Shad.....                 | 1,884,228   | 62,953    | 13,000,783  | 342,931   | 2,007,325     | 68,587  | 1,620,364 | 47,962   |
| Sheepshead.....           | 4,900       | 252       | 49,835      | 8,565     |               |         |           |          |
| Spanish mackerel.....     | 11,360      | 1,825     | 108,030     | 11,539    |               |         |           |          |
| Spots.....                |             |           | 20,700      | 682       |               |         |           |          |
| Squeteague.....           | 2,561,527   | 69,474    | 8,679,132   | 180,989   |               |         | 1,440,880 | 25,149   |
| Striped bass.....         | 116,465     | 14,177    | 287,189     | 31,978    | 9,556         | 991     | 128,770   | 12,033   |
| Sturgeon.....             | 427,547     | 26,248    | 813,449     | 26,464    | 9,945         | 260     | 280,350   | 9,014    |
| Suckers.....              | 16,050      | 635       | 142,130     | 6,720     | 25,250        | 1,244   | 35,200    | 1,543    |
| Tautog.....               | 49,181      | 1,534     | 289,400     | 5,513     |               |         | 4,800     | 240      |
| Tomcod or frost-fish..... | 41,000      | 912       | 1,850       | 20        |               |         |           |          |
| Whiting.....              | 9,000       | 250       | 4,000       | 50        |               |         |           |          |
| Other fish.....           | 1,239,200   | 6,066     | 27,972      | 1,316     | 1,952         | 173     |           |          |
| Crabs, hard.....          | 309,333     | 2,473     | 535,088     | 14,411    |               |         | 13,800    | 256      |
| Crabs, soft.....          | 103,847     | 3,502     | 260,213     | 25,658    |               |         | 155,000   | 5,133    |
| King crabs.....           |             |           | 1,124,800   | 4,495     |               |         | 675,000   | 2,025    |
| Lobsters.....             | 381,020     | 31,458    | 99,230      | 8,573     |               |         | 5,095     | 459      |
| Shrimp.....               |             |           | 2,896       | 1,565     |               |         | 320       | 160      |
| Squid.....                | 151,000     | 3,393     |             |           |               |         |           |          |
| Clams, hard.....          | 1,472,304   | 198,930   | 4,730,177   | 543,795   |               |         | 6,800     | 1,530    |
| Clams, soft.....          | 747,000     | 54,953    | 745,000     | 63,725    |               |         |           |          |
| Oysters, market.....      | 13,559,630  | 1,954,995 | 9,545,361   | 1,453,369 | 1,861,638     | 143,974 | 644,560   | 45,974   |
| Oysters, seed.....        | 1,327,410   | 95,063    | 11,489,980  | 228,646   |               |         | 501,830   | 17,923   |
| Mussels.....              | 30,000      | 960       | 2,520,000   | 1,575     |               |         |           |          |
| Scallops.....             | 885,960     | 80,122    | 72,000      | 4,000     |               |         |           |          |
| Terrapins.....            |             |           | 13,528      | 6,096     | 825           | 98      | 8,322     | 2,556    |
| Turtles.....              |             |           | 14,550      | 999       | 1,021         | 78      | 44,570    | 2,396    |
| Frogs and crawfish.....   |             |           |             |           | 78            | 16      |           |          |
| Caviar.....               |             |           | 200,155     | 67,592    |               |         | 69,479    | 25,736   |
| Shells.....               | 5,310,000   | 4,875     |             |           |               |         |           |          |
| Total.....                | 109,555,566 | 3,391,595 | 103,782,517 | 3,614,434 | 5,604,263     | 269,507 | 3,647,897 | 252,123  |

| Species.          | Maryland.  |           | Virginia.  |          | Total.     |           |
|-------------------|------------|-----------|------------|----------|------------|-----------|
|                   | Lbs.       | Value.    | Lbs.       | Value.   | Lbs.       | Value.    |
| Alewives.....     | 17,139,459 | \$123,453 | 13,689,510 | \$70,841 | 36,184,713 | \$229,983 |
| Black bass.....   | 6,765      | 613       | 14,075     | 654      | 25,093     | 1,697     |
| Blue-fish.....    | 186,708    | 7,156     | 1,505,228  | 34,802   | 18,015,333 | 581,563   |
| Bonito.....       | 1,000      | 50        | 25,350     | 798      | 427,873    | 12,556    |
| Butter-fish.....  | 87,040     | 2,348     | 465,828    | 10,624   | 1,498,541  | 44,964    |
| Carp.....         | 110,925    | 3,825     | 5,119      | 167      | 1,333,263  | 63,567    |
| Cat-fish.....     | 578,021    | 19,644    | 457,417    | 12,292   | 1,535,899  | 59,538    |
| Cero.....         | 1,000      | 50        | 1,200      | 73       | 7,300      | 283       |
| Cod.....          |            |           | 800        | 40       | 5,599,006  | 141,127   |
| Croakers.....     | 236,295    | 2,889     | 4,161,529  | 28,144   | 4,976,224  | 38,608    |
| Drum.....         | 43,000     | 386       | 114,420    | 1,094    | 240,320    | 2,322     |
| Eels.....         | 406,744    | 14,684    | 84,560     | 2,790    | 1,842,043  | 93,187    |
| Flounders.....    | 27,357     | 1,097     | 265,280    | 7,930    | 2,659,964  | 74,096    |
| Haddock.....      |            |           |            |          | 320,695    | 7,964     |
| Hake.....         |            |           |            |          | 94,035     | 2,146     |
| Hickory shad..... | 3,752      | 53        | 196,916    | 3,409    | 204,387    | 3,691     |
| King-fish.....    | 1,000      | 35        | 120,075    | 4,970    | 174,542    | 9,643     |

Table showing the quantity and value of products taken in the fisheries of the Middle Atlantic States in 1897—Continued.

| Species.             | Maryland.  |           | Virginia.   |           | Total.      |            |
|----------------------|------------|-----------|-------------|-----------|-------------|------------|
|                      | Lbs.       | Value.    | Lbs.        | Value.    | Lbs.        | Value.     |
| Mackerel             |            |           | 300         | \$18      | 165,412     | \$8,624    |
| Menhaden             | 353,100    | \$365     | 178,656,362 | 255,241   | 270,167,999 | 473,359    |
| Mullet               | 1,500      | 60        | 54,521      | 1,196     | 115,796     | 2,637      |
| Perch, white         | 925,545    | 49,963    | 273,294     | 13,527    | 2,257,546   | 123,786    |
| Perch, yellow        | 395,735    | 12,283    | 113,885     | 2,993     | 518,680     | 15,694     |
| Pike and pickerel    | 114,710    | 8,919     | 34,963      | 2,680     | 193,693     | 13,778     |
| Pollock              |            |           |             |           | 3,300       | 99         |
| Pompano              | 310        | 35        | 70,135      | 5,515     | 70,485      | 5,560      |
| Scup                 |            |           | 4,000       | 120       | 1,536,973   | 31,566     |
| Sea bass             | 16,200     | 690       | 1,765       | 40        | 3,405,786   | 127,351    |
| Shad                 | 5,799,563  | 159,365   | 11,529,474  | 304,448   | 35,841,737  | 981,246    |
| Sheepshead           | 200        | 12        | 28,968      | 1,905     | 83,903      | 10,734     |
| Spanish mackerel     | 9,762      | 833       | 503,106     | 39,911    | 632,258     | 54,108     |
| Spots                | 2,928      | 139       | 1,081,292   | 26,539    | 1,104,920   | 27,360     |
| Squeteague           | 597,179    | 14,792    | 6,525,806   | 89,967    | 19,804,524  | 380,371    |
| Striped bass         | 935,347    | 70,045    | 576,262     | 35,079    | 2,053,589   | 164,303    |
| Sturgeon             | 145,569    | 5,008     | 631,619     | 16,563    | 2,308,479   | 83,557     |
| Suckers              | 83,030     | 1,801     | 75,606      | 2,250     | 377,266     | 14,198     |
| Tautog               |            |           |             |           | 343,381     | 7,287      |
| Tomcod or frost-fish |            |           |             |           | 42,850      | 932        |
| Whiting              |            |           | 14,100      | 285       | 27,100      | 585        |
| Other fish           | 4,000      | 152       | 169,534     | 4,256     | 1,442,658   | 11,963     |
| Crabs, hard          | 5,333,316  | 39,949    | 5,331,398   | 28,331    | 11,522,985  | 85,420     |
| Crabs, soft          | 4,115,879  | 177,637   | 1,068,116   | 39,914    | 5,703,055   | 251,844    |
| King crabs           |            |           |             |           | 1,799,800   | 6,520      |
| Lobsters             |            |           |             |           | 485,345     | 40,490     |
| Shrimp               | 1,020      | 510       |             |           | 4,236       | 2,235      |
| Squid                |            |           |             |           | 151,000     | 3,393      |
| Clams, hard          | 122,288    | 8,842     | 841,568     | 66,097    | 7,173,137   | 819,194    |
| Clams, soft          |            |           |             |           | 1,492,000   | 118,678    |
| Oysters, market      | 50,784,538 | 2,885,202 | 49,166,936  | 2,041,683 | 125,562,563 | 8,525,197  |
| Oysters, seed        |            |           |             |           | 13,319,220  | 341,632    |
| Mussels              |            |           |             |           | 2,550,000   | 2,535      |
| Scallops             |            |           |             |           | 957,960     | 84,122     |
| Terrapins            | 7,266      | 3,226     | 11,822      | 2,104     | 41,763      | 14,080     |
| Turtles              | 5,465      | 289       | 56,825      | 1,077     | 122,431     | 4,839      |
| Frogs and crawfish   | 2,908      | 262       | 1,025       | 108       | 4,011       | 386        |
| Caviar               | 1,594      | 644       | 63,960      | 19,023    | 335,188     | 112,995    |
| Shells               |            |           |             |           | 5,810,000   | 4,875      |
| Total                | 88,588,018 | 3,617,306 | 277,993,949 | 3,179,498 | 594,172,210 | 14,324,463 |

Certain crustacean and molluscan products obtained in the fisheries of the Middle Atlantic States in 1897, which have been designated in pounds in the foregoing table, are presented in number or bushels in the following supplementary table:

| Products.               | New York. |           | New Jersey. |           | Pennsylvania. |           | Delaware. |        |
|-------------------------|-----------|-----------|-------------|-----------|---------------|-----------|-----------|--------|
|                         | No.       | Value.    | No.         | Value.    | No.           | Value.    | No.       | Value. |
| Crabs, hard.... number  | 927,999   | \$2,473   | 1,605,264   | \$14,411  |               |           | 41,400    | \$256  |
| Crabs, soft..... do     | 311,541   | 3,502     | 780,639     | 25,658    |               |           | 465,000   | 5,133  |
| King crabs..... do      |           |           | 562,400     | 4,495     |               |           | 337,500   | 2,025  |
| Clams, hard.... bushels | 184,038   | 198,930   | 591,272     | 543,795   |               |           | 850       | 1,530  |
| Clams, soft..... do     | 74,700    | 54,953    | 74,500      | 63,725    |               |           |           |        |
| Oysters..... do         | 2,126,720 | 2,050,058 | 3,005,049   | 1,682,015 | 265,934       | \$143,974 | 163,770   | 63,897 |
| Mussels..... do         | 3,000     | 960       | 50,400      | 1,575     |               |           |           |        |
| Scallops..... do        | 147,660   | 80,122    | 12,000      | 4,000     |               |           |           |        |
| Shells..... do          | 88,500    | 4,875     |             |           |               |           |           |        |

| Products.                | Maryland.  |           | Virginia.  |           | Total.     |           |
|--------------------------|------------|-----------|------------|-----------|------------|-----------|
|                          | No.        | Value.    | No.        | Value.    | No.        | Value.    |
| Crabs, hard..... number  | 15,999,948 | \$39,949  | 15,994,194 | \$28,331  | 34,568,805 | \$85,420  |
| Crabs, soft..... do      | 12,347,637 | 177,637   | 3,204,348  | 39,914    | 17,109,165 | 251,844   |
| King crabs..... do       |            |           |            |           | 899,900    | 6,520     |
| Clams, hard..... bushels | 15,286     | 8,842     | 105,196    | 66,097    | 896,642    | 819,194   |
| Clams, soft..... do      |            |           |            |           | 149,200    | 118,678   |
| Oysters..... do          | 7,254,934  | 2,885,202 | 7,023,848  | 2,041,683 | 19,840,254 | 8,866,829 |
| Mussels..... do          |            |           |            |           | 53,400     | 2,535     |
| Scallops..... do         |            |           |            |           | 159,660    | 84,122    |
| Shells..... do           |            |           |            |           | 88,500     | 4,875     |



*Comparative table showing the extent of the fisheries of the Middle Atlantic States in 1891 and 1897.*

## PERSONS ENGAGED.

| States.           | 1891.  | 1897.  | Increase or decrease in 1897 compared with 1891. | Percentage of increase or decrease in 1897 compared with 1891. |
|-------------------|--------|--------|--|--|
| New York.....     | 12,246 | 8,862  | -3,384   | -27.63   |
| New Jersey.....   | 10,639 | 12,494 | +1,855   | +17.44   |
| Pennsylvania..... | 2,273  | 1,898  | -375   | -16.50   |
| Delaware.....     | 2,280  | 2,392  | +162   | +7.26  |
| Maryland.....     | 39,944 | 42,812 | +2,868   | +7.18  |
| Virginia.....     | 23,595 | 28,277 | +4,682   | +19.84   |
| Total.....        | 90,927 | 96,735 | +5,808   | +6.38  |

## CAPITAL INVESTED.

| States.           | 1891.       | 1897.       | Increase or decrease in 1897 compared with 1891. | Percentage of increase or decrease in 1897 compared with 1891. |
|-------------------|-------------|-------------|--|--|
| New York.....     | \$5,283,200 | \$7,012,725 | +\$1,729,525                                     | +32.73   |
| New Jersey.....   | 2,467,865   | 2,371,253   | -96,612  | -3.91  |
| Pennsylvania..... | 944,140     | 1,601,528   | +657,388   | +69.63   |
| Delaware.....     | 208,082     | 407,819     | +199,737   | +95.99   |
| Maryland.....     | 7,466,718   | 5,821,610   | -1,645,108                                       | -22.03   |
| Virginia.....     | 2,948,659   | 2,891,536   | -57,123  | -1.94  |
| Total.....        | 19,318,664  | 20,106,471  | +787,807   | +4.07  |

## PRODUCTS.

| States.           | Pounds.     |             | Increase or decrease in 1897 compared with 1891. | Percentage of increase or decrease in 1897 compared with 1891. |
|-------------------|-------------|-------------|--|--|
|                   | 1891.       | 1897.       |  |  |
| New York.....     | 170,885,022 | 109,555,566 | -61,329,456                                      | -35.89   |
| New Jersey.....   | 79,116,380  | 103,782,517 | +24,666,137                                      | +31.18   |
| Pennsylvania..... | 7,583,657   | 5,604,263   | -1,979,394                                       | -26.10   |
| Delaware.....     | 7,697,649   | 8,647,897   | +950,248   | +12.34   |
| Maryland.....     | 141,177,827 | 88,588,018  | -52,589,809                                      | -37.25   |
| Virginia.....     | 183,993,834 | 277,993,949 | +94,000,115                                      | +51.09   |
| Total.....        | 590,454,369 | 594,172,210 | +3,717,841                                       | +.63   |

| States.           | Value.      |             | Increase or decrease in 1897 compared with 1891. | Percentage of increase or decrease in 1897 compared with 1891. |
|-------------------|-------------|-------------|--|--|
|                   | 1891.       | 1897.       |  |  |
| New York.....     | \$4,817,369 | \$3,391,595 | -\$1,425,774                                     | -29.60   |
| New Jersey.....   | 3,520,057   | 3,614,434   | +94,377  | +2.68  |
| Pennsylvania..... | 322,021     | 269,507     | -52,514  | -16.31   |
| Delaware.....     | 255,423     | 252,123     | -3,300   | -1.29  |
| Maryland.....     | 6,460,759   | 3,617,306   | -2,843,453                                       | -44.01   |
| Virginia.....     | 3,647,845   | 3,179,498   | -468,347   | -12.84   |
| Total.....        | 19,023,474  | 14,324,463  | -4,699,011                                       | -24.70   |

NOTE.—In the first two sections of the above table, comparing the statistics for 1897 with those for 1891, it has been necessary, in order to secure the same basis of comparison for both years, to include in the data for 1897 an estimate of the number of persons engaged and the amount of capital invested in the wholesale fishery trade of New York City, based on statistics for the year 1898, no data on the wholesale trade of that city having been obtained for the year 1897.

## FISHERIES OF NEW YORK.

Compared with 1891 the returns for the fishery industries of New York State show a considerable decrease as regards the total number of persons employed and the value of the products, the former item decreasing from 12,246 in 1891 to 9,185 in 1898, and the latter from \$4,817,369 to \$3,545,189 in the same period. In the item of value of investment there has been a large increase—from \$5,283,200 in 1891 to \$7,589,787 in 1898; but this increase has been principally in the valuation of shore property and cash capital, the returns for which show an increase from \$3,374,655 to \$5,741,221. Omitting these items, the value of investment has decreased during the period under comparison from \$1,908,545 to \$1,848,566.

The decrease in the number of fishermen of this State has been principally in the shore or boat fisheries, due not only to the reduced extent of the fisheries, but also to the semiprofessional fishermen finding employment in the various other industries developing along the coast. The number of shoresmen has also decreased, while on the other hand the vessel fisheries have largely increased, especially those for blue-fish and menhaden.

The most important fishery industry of the State is the oyster industry, which in 1898 yielded 56 per cent in value of the total products. Next comes the menhaden fishery, with a yield of \$405,488, or 8 per cent of the total; but these figures fail in doing justice to that industry, since the rendering of the fish into oil and fertilizer gives employment to nearly as many men and as large a capitalization as the taking of the fish. The blue-fish fishery is almost as important as the menhaden, the value of the product in 1898 being \$387,167. This is the most important fishery of the State for the taking of food-fish proper, and its extent has increased almost constantly during the past ten years, the total yield in 1898 being 11,214,433 pounds, whereas ten years previously it was less than half that amount. This is not due to an increase in abundance of that species, but to its enhanced popularity as a food article and to an increase in the size of the fleet and the extension of the fishing season and grounds, vessels now leaving port in March and going as far south as Cape Lookout. The fisheries for hard clams, cod, shad, squeteague, and soft clams, which, in the order named, rank next in value, all show a decrease from the extent of ten years ago. With the exception of blue-fish and menhaden, the only products showing an increase as compared with ten years ago are sturgeon, lobsters, mackerel, and scallops.

The returns for the extent of the fisheries of New York in 1897 and 1898 are here presented in three tables, relating, respectively, to quantity and value of the products, the persons employed, and the capital invested.

Table of products.

| Species.                  | 1897.                   |           | 1898.                    |           |
|---------------------------|-------------------------|-----------|--------------------------|-----------|
|                           | Lbs.                    | Value.    | Lbs.                     | Value.    |
| Alewives.....             | 955,000                 | \$11,367  | 1,028,110                | \$12,652  |
| Blue-fish.....            | 11,146,424              | 391,027   | 11,214,433               | 387,167   |
| Bonito.....               | 42,823                  | 2,103     | 63,244                   | 1,718     |
| Butter-fish.....          | 728,616                 | 26,125    | 470,836                  | 15,488    |
| Carp.....                 | 205,560                 | 8,318     | 286,400                  | 11,543    |
| Cat-fish.....             | 90,090                  | 5,656     | 102,340                  | 6,151     |
| Cod.....                  | 2,116,316               | 69,879    | 2,040,137                | 69,032    |
| Eels.....                 | 420,730                 | 29,226    | 396,945                  | 27,517    |
| Flounders.....            | 1,108,057               | 35,174    | 876,683                  | 28,455    |
| Haddock.....              | 153,320                 | 4,904     | 172,883                  | 5,548     |
| Hake.....                 | 24,300                  | 608       | 32,621                   | 684       |
| King-fish.....            | 10,440                  | 872       | 11,854                   | 978       |
| Mackerel.....             | 140,812                 | 6,978     | 84,458                   | 6,208     |
| Menhaden.....             | 60,605,712              | 147,697   | 163,280,345              | 405,488   |
| Perch, white.....         | 62,490                  | 3,244     | 60,310                   | 3,245     |
| Perch, yellow.....        | 3,100                   | 121       | 3,040                    | 117       |
| Pike.....                 |                         |           | 1,800                    | 90        |
| Pollock.....              | 3,000                   | 90        | 4,635                    | 130       |
| Scup.....                 | 746,373                 | 16,911    | 645,397                  | 14,102    |
| Sea bass.....             | 354,441                 | 16,245    | 311,181                  | 13,990    |
| Shad.....                 | 1,884,228               | 62,953    | 1,828,977                | 62,745    |
| Sheepshead.....           | 4,900                   | 252       | 3,150                    | 174       |
| Skates.....               | 150,000                 | 100       | 127,500                  | 85        |
| Snappers, red.....        | 92,000                  | 3,680     | 76,000                   | 3,040     |
| Spanish mackerel.....     | 11,360                  | 1,825     | 13,007                   | 2,061     |
| Squeteague.....           | 2,561,527               | 69,474    | 2,076,930                | 53,706    |
| Striped bass.....         | 116,465                 | 14,177    | 81,795                   | 9,765     |
| Sturgeon <i>a</i> .....   | 427,547                 | 26,248    | 391,055                  | 34,581    |
| Suckers.....              | 16,050                  | 635       | 17,550                   | 758       |
| Sun-fish.....             |                         |           | 2,000                    | 100       |
| Tautog.....               | 49,181                  | 1,534     | 51,260                   | 1,607     |
| Tomcod or frost-fish..... | 41,000                  | 912       | 34,700                   | 699       |
| Whiting.....              | 9,000                   | 250       | 15,473                   | 449       |
| Other fish.....           | 997,200                 | 2,286     | 847,298                  | 1,756     |
| Caviar <i>a</i> .....     |                         |           | 17,256                   | 11,992    |
| Crabs, hard.....          | <sup>1</sup> 309,333    | 2,473     | <sup>2</sup> 246,633     | 1,793     |
| Crabs, soft.....          | <sup>3</sup> 103,847    | 3,502     | <sup>4</sup> 100,823     | 3,394     |
| Lobsters.....             | 381,020                 | 31,458    | 332,378                  | 30,235    |
| Squid.....                | 151,000                 | 3,393     | 276,257                  | 6,188     |
| Clams, hard.....          | <sup>5</sup> 1,472,304  | 198,930   | <sup>6</sup> 1,503,192   | 205,952   |
| Clams, soft.....          | <sup>7</sup> 747,000    | 54,953    | <sup>8</sup> 817,800     | 60,797    |
| Oysters, market.....      | <sup>9</sup> 13,559,630 | 1,954,995 | <sup>10</sup> 12,823,237 | 1,863,607 |
| Oysters, seed.....        | <sup>11</sup> 1,327,410 | 95,063    | <sup>12</sup> 1,612,275  | 121,422   |
| Mussels.....              | <sup>13</sup> 30,000    | 960       |                          |           |
| Scallops.....             | <sup>14</sup> 885,960   | 80,122    | <sup>15</sup> 653,178    | 53,430    |
| Shells.....               | <sup>16</sup> 5,310,000 | 4,875     | <sup>17</sup> 5,460,000  | 4,550     |
| Total.....                | 109,555,566             | 3,391,595 | 210,497,376              | 3,545,189 |

*a* The returns for sturgeon in 1897 show the gross weight and value of the fish, whereas those for 1898 show the net or dressed weight of the fish and its value—the weight and value of the caviar being listed separately.

<sup>1</sup> 927,999 in number.

<sup>6</sup> 187,899 bushels.

<sup>10</sup> 1,831,891 bushels.

<sup>14</sup> 147,660 bushels.

<sup>2</sup> 739,899 in number.

<sup>7</sup> 74,700 bushels.

<sup>11</sup> 189,630 bushels.

<sup>15</sup> 108,863 bushels.

<sup>3</sup> 311,541 in number.

<sup>8</sup> 81,780 bushels.

<sup>12</sup> 230,325 bushels.

<sup>16</sup> 88,500 bushels.

<sup>4</sup> 302,469 in number.

<sup>9</sup> 1,937,090 bushels.

<sup>13</sup> 3,000 bushels.

<sup>17</sup> 91,000 bushels.

<sup>5</sup> 184,038 bushels.

A supplementary table is here presented showing for the same period as above noted the product of mollusks and crustaceans according to the unit of quantity in which they are usually sold, instead of by pounds, which for the purpose of comparison is the unit of quantity employed in the main tables:

| Products.                    | 1897.     |           | 1898.     |           |
|------------------------------|-----------|-----------|-----------|-----------|
|                              | No.       | Value.    | No.       | Value.    |
| Crabs, hard.....number.....  | 927,999   | \$2,473   | 739,899   | \$1,793   |
| Crabs, soft.....do.....      | 311,541   | 3,502     | 302,469   | 3,394     |
| Clams, hard.....bushels..... | 184,038   | 198,930   | 187,899   | 205,952   |
| Clams, soft.....do.....      | 74,700    | 54,953    | 81,780    | 60,797    |
| Oysters, market.....do.....  | 1,937,090 | 1,954,995 | 1,831,891 | 1,863,607 |
| Oysters, seed.....do.....    | 189,630   | 95,063    | 230,325   | 121,422   |
| Mussels.....do.....          | 3,000     | 960       |           |           |
| Scallops.....do.....         | 147,660   | 80,122    | 108,863   | 53,430    |
| Shells.....do.....           | 88,500    | 4,875     | 91,000    | 4,550     |

*Number of persons employed.*

| How engaged.                     | 1897.  | 1898. |
|----------------------------------|--------|-------|
| On vessels fishing .....         | 2,010  | 2,549 |
| On vessels transporting .....    | 271    | 270   |
| In shore or boat fisheries ..... | 4,656  | 4,522 |
| Shoresmen .....                  | *506   | 1,844 |
| Total .....                      | *7,443 | 9,185 |

\* Exclusive of persons in the wholesale trade of New York City.

*Table of apparatus and capital.*

| Items.                      | 1897. |            | 1898. |           |
|-----------------------------|-------|------------|-------|-----------|
|                             | No.   | Value.     | No.   | Value.    |
| Vessels fishing .....       | 477   | \$682,790  | 501   | \$940,415 |
| Tonnage .....               | 7,413 |            | 9,258 |           |
| Outfit .....                |       | 191,782    |       | 256,486   |
| Vessels transporting .....  | 166   | 127,785    | 166   | 143,395   |
| Tonnage .....               | 2,261 |            | 2,365 |           |
| Outfit .....                |       | 9,293      |       | 9,789     |
| Boats .....                 | 4,089 | 267,181    | 3,970 | 258,262   |
| Apparatus—vessel fisheries: |       |            |       |           |
| Seines .....                | 39    | 16,800     | 81    | 38,250    |
| Gill nets .....             | 51    | 4,770      | 69    | 4,641     |
| Lines .....                 |       | 5,025      |       | 5,085     |
| Eel pots .....              | 655   | 653        | 661   | 647       |
| Lobster pots .....          | 2,236 | 3,698      | 2,796 | 4,663     |
| Dredges .....               | 1,155 | 9,644      | 1,159 | 9,735     |
| Tongs and rakes .....       | 603   | 4,222      | 590   | 3,932     |
| Apparatus—shore fisheries:  |       |            |       |           |
| Seines .....                | 140   | 10,010     | 148   | 9,840     |
| Gill nets .....             | 3,118 | 60,417     | 2,870 | 59,048    |
| Pound nets .....            | 197   | 53,780     | 195   | 55,385    |
| Fyke nets .....             | 3,487 | 17,195     | 3,531 | 16,016    |
| Dip nets .....              | 13    | 7          | 13    | 7         |
| Lines .....                 |       | 1,738      |       | 1,927     |
| Eel pots .....              | 3,572 | 4,167      | 3,399 | 3,926     |
| Lobster pots .....          | 2,477 | 2,474      | 2,873 | 2,856     |
| Spears .....                | 94    | 56         | 85    | 51        |
| Dredges .....               | 1,381 | 5,282      | 1,294 | 4,674     |
| Tongs and rakes .....       | 2,399 | 13,134     | 2,300 | 12,607    |
| Hoes and forks .....        | 632   | 376        | 656   | 399       |
| Scows, floats, etc. ....    | 30    | 7,160      | 28    | 6,530     |
| Shore property .....        |       | *437,930   |       | 2,760,421 |
| Cash capital .....          |       | *157,500   |       | 2,980,800 |
| Total .....                 |       | *2,094,869 |       | 7,589,787 |

\* Exclusive of shore property and cash capital in the wholesale trade of New York City.

## STATISTICS OF THE FISHERIES BY COUNTIES.

The following tables show the extent of the fisheries of New York by counties. Suffolk County easily leads in persons employed and in quantity and value of products, the yield amounting to 87 per cent of the total weight and 43 per cent of the total value in the State. It also has the greatest variety of products, nearly every kind of fishery products in the State being found in the limits of that county. The most important fisheries are for oysters and menhaden, their value aggregating \$1,181,013, or 75 per cent of the value of the total yield. Prominent among other products in this county are hard clams, scallops, squeteague, sturgeon, flounders, blue-fish, butter-fish, and scup. The sturgeon fishery, prosecuted on the south side of this county from Fire Island to Amaganset, is a comparatively new industry, originating about seven years ago.

Next to Suffolk, the counties most prominent in the fisheries are Queens, New York, Richmond, and Kings, in the order named, the value of products in those counties in 1898 ranging from \$620,591 in Queens to \$374,870 in Kings County. The oyster yield is the most valuable in each except New York, in which the blue-fish fishery is far the most valuable. In those counties bordering on the Hudson the fisheries are of much less importance, the principal species being shad and alewives, which are taken chiefly in gill nets and seines.

*Table showing, by counties, the number of persons employed in the fisheries of New York in 1897 and 1898.*

| Counties.   | On vessels fishing. |       | On vessels transporting. |       | In shore or boat fisheries. |       | Shoresmen. |       | Total. |       |
|-------------|---------------------|-------|--------------------------|-------|-----------------------------|-------|------------|-------|--------|-------|
|             | 1897.               | 1898. | 1897.                    | 1898. | 1897.                       | 1898. | 1897.      | 1898. | 1897.  | 1898. |
| Albany      |                     |       |                          |       | 50                          | 49    |            |       | 50     | 49    |
| Columbia    |                     |       |                          |       | 57                          | 61    | 1          |       | 57     | 62    |
| Dutchess    |                     |       |                          |       | 216                         | 204   | 2          | 2     | 218    | 206   |
| Greene      |                     |       |                          |       | 78                          | 89    | 2          | 2     | 80     | 91    |
| Kings       | 75                  | 30    | 45                       | 47    | 495                         | 481   | 82         | 10    | 697    | 568   |
| New York    | 629                 | 671   | 8                        | 8     |                             |       |            | 1,419 | *637   | 2,098 |
| Orange      |                     |       |                          |       | 68                          | 64    |            |       | 68     | 64    |
| Putnam      |                     |       |                          |       | 14                          | 10    |            |       | 14     | 10    |
| Queens      | 161                 | 176   | 104                      | 90    | 998                         | 952   | 9          | 9     | 1,272  | 1,227 |
| Rensselaer  |                     |       |                          |       | 30                          | 30    |            |       | 30     | 30    |
| Richmond    | 252                 | 245   |                          |       | 330                         | 322   | 5          | 13    | 587    | 580   |
| Rockland    |                     |       |                          |       | 123                         | 119   |            |       | 123    | 119   |
| Suffolk     | 873                 | 1,406 | 114                      | 125   | 1,539                       | 1,498 | 391        | 373   | 2,917  | 3,402 |
| Ulster      |                     |       |                          |       | 268                         | 264   | 9          | 9     | 277    | 273   |
| Westchester | 20                  | 21    |                          |       | 390                         | 379   | 6          | 6     | 416    | 406   |
| Total       | 2,010               | 2,549 | 271                      | 270   | 4,656                       | 4,522 | *506       | 1,844 | *7,443 | 9,185 |

\* Exclusive of persons engaged in the wholesale trade of New York City.

*Table showing, by counties, the vessels, boats, and apparatus employed in the fisheries of New York in 1897 and 1898.*

| Items.                     | Albany. |       |       |       | Columbia. |        |       |         | Dutchess. |         |       |         |
|----------------------------|---------|-------|-------|-------|-----------|--------|-------|---------|-----------|---------|-------|---------|
|                            | 1897.   |       | 1898. |       | 1897.     |        | 1898. |         | 1897.     |         | 1898. |         |
|                            | No.     | Val.  | No.   | Val.  | No.       | Value. | No.   | Value.  | No.       | Value.  | No.   | Value.  |
| Boats                      | 19      | \$430 | 19    | \$430 | 25        | \$750  | 30    | \$1,182 | 111       | \$4,815 | 105   | \$4,616 |
| Apparatus—shore fisheries: |         |       |       |       |           |        |       |         |           |         |       |         |
| Seines                     | 5       | 370   | 5     | 350   | 8         | 775    | 5     | 525     | 3         | 360     | 6     | 495     |
| Gill nets                  |         |       |       |       | 10        | 406    | 10    | 406     | 100       | 6,571   | 97    | 6,296   |
| Fyke nets                  | 60      | 210   | 54    | 190   | 52        | 270    | 60    | 274     | 76        | 284     | 77    | 300     |
| Eel pots                   | 12      | 15    | 12    | 15    |           |        |       |         | 26        | 26      | 27    | 27      |
| Shore property             |         | 220   |       | 220   |           | 575    |       | 650     |           | 1,665   |       | 1,855   |
| Total                      |         | 1,245 |       | 1,205 |           | 2,776  |       | 3,037   |           | 13,721  |       | 13,589  |

| Items.                     | Greene. |         |       |         | Orange. |         |       |         | Putnam. |       |       |       |
|----------------------------|---------|---------|-------|---------|---------|---------|-------|---------|---------|-------|-------|-------|
|                            | 1897.   |         | 1898. |         | 1897.   |         | 1898. |         | 1897.   |       | 1898. |       |
|                            | No.     | Value.  | No.   | Value.  | No.     | Value.  | No.   | Value.  | No.     | Val.  | No.   | Val.  |
| Boats                      | 46      | \$1,146 | 55    | \$1,269 | 37      | \$1,707 | 35    | \$1,517 | 7       | \$402 | 5     | \$272 |
| Apparatus—shore fisheries: |         |         |       |         |         |         |       |         |         |       |       |       |
| Seines                     | 11      | 1,070   | 11    | 1,055   | 1       | 40      | 1     | 40      | 1       | 40    | 1     | 45    |
| Gill nets                  | 17      | 612     | 24    | 770     | 38      | 2,320   | 30    | 1,995   | 6       | 430   | 4     | 320   |
| Fyke nets                  | 40      | 140     | 36    | 128     | 74      | 562     | 70    | 548     |         |       |       |       |
| Shore property             |         | 655     |       | 770     |         | 750     |       | 745     |         | 90    |       | 60    |
| Total                      |         | 3,623   |       | 3,992   |         | 5,379   |       | 4,845   |         | 962   |       | 697   |



Table showing, by counties, the vessels, boats, and apparatus employed, etc.—Continued.

| Items.                   | Kings. |          |       |         | New York. |           |       |           | Queens. |          |       |          |
|--------------------------|--------|----------|-------|---------|-----------|-----------|-------|-----------|---------|----------|-------|----------|
|                          | 1897.  |          | 1898. |         | 1897.     |           | 1898. |           | 1897.   |          | 1898. |          |
|                          | No.    | Value.   | No.   | Value.  | No.       | Value.    | No.   | Value.    | No.     | Value.   | No.   | Value.   |
| Vessels fishing .....    | 15     | \$22,200 | 13    | \$7,120 | 59        | \$196,500 | 63    | \$203,550 | 53      | \$39,065 | 58    | \$49,200 |
| Tonnage .....            | 229    |          | 79    |         | 2,648     |           | 2,886 |           | 431     |          | 460   |          |
| Outfit .....             |        | 10,015   |       | 2,648   |           | 100,612   |       | 103,468   |         | 9,901    |       | 10,976   |
| Vessels transport-       |        |          |       |         |           |           |       |           |         |          |       |          |
| ing .....                | 34     | 22,680   | 36    | 22,750  | 3         | 3,670     | 3     | 3,650     | 56      | 41,175   | 49    | 35,570   |
| Tonnage .....            | 364    |          | 387   |         | 66        |           | 66    |           | 802     |          | 695   |          |
| Outfit .....             |        | 1,715    |       | 1,753   |           | 560       |       | 575       |         | 2,703    |       | 2,363    |
| Boats .....              | 378    | 21,930   | 374   | 21,240  |           |           |       |           | 1,016   | 76,144   | 956   | 71,984   |
| Apparatus—vessel         |        |          |       |         |           |           |       |           |         |          |       |          |
| fisheries:               |        |          |       |         |           |           |       |           |         |          |       |          |
| Seines .....             | 4      | 2,000    |       |         | 4         | 1,800     | 4     | 1,750     | 4       | 500      | 3     | 300      |
| Gill nets .....          |        |          |       |         | 4         | 200       | 4     | 200       | 11      | 1,185    | 11    | 1,160    |
| Lines .....              |        | 241      |       | 236     |           | 4,320     |       | 4,525     |         | 243      |       | 253      |
| Eel pots .....           | 175    | 128      | 175   | 123     |           |           |       |           |         |          |       |          |
| Lobster pots .....       |        |          |       |         | 1,100     | 1,697     | 1,660 | 2,662     |         |          |       |          |
| Dredges .....            |        |          |       |         | 28        | 495       | 24    | 395       | 80      | 861      | 100   | 1,176    |
| Tongs and rakes .....    |        |          |       |         |           |           |       |           | 6       | 24       | 6     | 24       |
| Apparatus—shore          |        |          |       |         |           |           |       |           |         |          |       |          |
| fisheries:               |        |          |       |         |           |           |       |           |         |          |       |          |
| Seines .....             |        |          |       |         |           |           |       |           | 23      | 1,595    | 20    | 1,215    |
| Gill nets .....          | 174    | 5,410    | 108   | 4,176   |           |           |       |           | 10      | 760      | 9     | 635      |
| Pound nets .....         | 3      | 900      | 3     | 980     |           |           |       |           | 6       | 1,820    | 3     | 900      |
| Fyke nets .....          | 86     | 900      | 34    | 870     |           |           |       |           | 1       | 25       | 1     | 25       |
| Lines .....              |        | 274      |       | 290     |           |           |       |           |         | 98       |       | 74       |
| Eel pots .....           | 504    | 463      | 488   | 444     |           |           |       |           | 702     | 1,022    | 652   | 964      |
| Lobster pots .....       | 310    | 190      | 670   | 364     |           |           |       |           |         |          |       |          |
| Spears .....             | 30     | 18       | 26    | 16      |           |           |       |           | 28      | 15       | 24    | 13       |
| Dredges .....            | 30     | 210      | 24    | 167     |           |           |       |           | 374     | 2,271    | 335   | 2,034    |
| Tongs and rakes .....    | 391    | 1,954    | 379   | 1,890   |           |           |       |           | 697     | 3,580    | 665   | 3,383    |
| Hoes and forks .....     | 180    | 96       | 210   | 126     |           |           |       |           | 255     | 149      | 250   | 144      |
| Scows, floats, etc. .... | 2      | 160      | 1     | 80      |           |           |       |           | 14      | 1,400    | 14    | 1,250    |
| Shore property .....     |        | 62,900   |       | 27,200  |           |           |       | 2,048,656 |         | 59,855   |       | 64,780   |
| Cash capital .....       |        | 45,000   |       |         |           |           |       | 2,869,200 |         |          |       |          |
| Total .....              |        | 199,384  |       | 92,478  |           | 309,854   |       | 5,238,631 |         | 244,411  |       | 248,423  |

| Items.                     | Richmond. |          |       |          | Suffolk. |           |       |           | Westchester. |         |       |         |
|----------------------------|-----------|----------|-------|----------|----------|-----------|-------|-----------|--------------|---------|-------|---------|
|                            | 1897.     |          | 1898. |          | 1897.    |           | 1898. |           | 1897.        |         | 1898. |         |
|                            | No.       | Val.     | No.   | Val.     | No.      | Val.      | No.   | Val.      | No.          | Val.    | No.   | Val.    |
| Vessels fishing .....      | 83        | \$89,845 | 81    | \$85,180 | 256      | \$329,135 | 276   | \$589,875 | 11           | \$6,025 | 10    | \$5,490 |
| Tonnage .....              | 1,014     |          | 987   |          | 2,999    |           | 4,764 |           | 92           |         | 82    |         |
| Outfits .....              |           | 10,410   |       | 9,870    |          | 59,794    |       | 128,677   |              | 1,050   |       | 847     |
| Vessels transporting ..... |           |          |       |          | 73       | 60,260    | 78    | 81,425    |              |         |       |         |
| Tonnage .....              |           |          |       |          | 1,029    |           | 1,217 |           |              |         |       |         |
| Outfit .....               |           |          |       |          |          | 4,315     |       | 5,098     |              |         |       |         |
| Boats .....                | 319       | 23,797   | 309   | 22,420   | 1,592    | 113,469   | 1,566 | 112,123   | 319          | 13,117  | 305   | 12,506  |
| Apparatus—vessel fish-     |           |          |       |          |          |           |       |           |              |         |       |         |
| eries:                     |           |          |       |          |          |           |       |           |              |         |       |         |
| Seines .....               |           |          |       |          | 27       | 12,500    | 74    | 36,200    |              |         |       |         |
| Gill nets .....            |           |          |       |          | 36       | 3,385     | 54    | 3,281     |              |         |       |         |
| Lines .....                |           |          |       |          |          | 221       |       | 71        |              |         |       |         |
| Eel pots .....             |           |          |       |          | 480      | 525       | 486   | 524       |              |         |       |         |
| Lobster pots .....         |           |          |       |          | 1,136    | 2,001     | 1,136 | 2,001     |              |         |       |         |
| Dredges .....              | 96        | 3,720    | 92    | 3,560    | 916      | 4,333     | 913   | 4,404     | 35           | 235     | 30    | 200     |
| Tongs and rakes .....      | 268       | 2,844    | 261   | 2,580    | 313      | 1,258     | 309   | 1,244     | 16           | 96      | 14    | 84      |
| Apparatus—shore fisheries: |           |          |       |          |          |           |       |           |              |         |       |         |
| Seines .....               |           |          |       |          | 69       | 3,780     | 78    | 4,075     | 6            | 400     | 7     | 400     |
| Gill nets .....            | 193       | 2,930    | 159   | 3,185    | 524      | 19,405    | 630   | 21,864    | 430          | 9,483   | 1,151 | 8,962   |
| Pound nets .....           | 1         | 400      | 1     | 360      | 187      | 50,660    | 188   | 53,145    |              |         |       |         |
| Fyke nets .....            | 13        | 1,270    | 9     | 730      | 2,638    | 9,834     | 2,745 | 9,878     | 231          | 2,086   | 189   | 1,555   |
| Dip nets .....             |           |          |       |          | 13       | 7         | 13    | 7         |              |         |       |         |
| Lines .....                |           | 52       |       | 28       |          | 1,314     |       | 1,535     |              |         |       |         |
| Eel pots .....             | 20        | 30       | 20    | 30       | 2,075    | 2,436     | 1,984 | 2,288     | 215          | 155     | 200   | 140     |
| Lobster pots .....         | 1,605     | 1,159    | 1,510 | 1,072    | 319      | 518       | 411   | 732       | 243          | 607     | 282   | 688     |
| Spears .....               |           |          |       |          | 36       | 23        | 35    | 22        |              |         |       |         |
| Dredges .....              |           |          |       |          | 957      | 2,661     | 919   | 2,361     | 20           | 140     | 16    | 112     |
| Tongs and rakes .....      | 395       | 3,438    | 388   | 3,425    | 780      | 3,123     | 738   | 2,963     | 136          | 979     | 130   | 946     |
| Hoes and forks .....       |           |          |       |          | 135      | 86        | 136   | 86        | 62           | 45      | 60    | 43      |
| Scows, floats, etc. ....   | 14        | 5,600    | 13    | 5,200    |          |           |       |           |              |         |       |         |
| Shore property .....       |           | 15,055   |       | 15,405   |          | 286,630   |       | 590,560   |              | 5,870   |       | 5,880   |
| Cash capital .....         |           |          |       |          |          | 112,500   |       | 111,600   |              |         |       |         |
| Total .....                |           | 160,610  |       | 163,045  |          | 1,084,173 |       | 1,766,039 |              | 40,288  |       | 37,853  |

Table showing, by counties, the vessels, boats, and apparatus employed, etc.—Continued.

| Items.                       | Rensselaer. |        |       |        | Rockland. |         |       |         | Ulster. |         |       |         |
|------------------------------|-------------|--------|-------|--------|-----------|---------|-------|---------|---------|---------|-------|---------|
|                              | 1897.       |        | 1898. |        | 1897.     |         | 1898. |         | 1897.   |         | 1898. |         |
|                              | No.         | Value. | No.   | Value. | No.       | Value.  | No.   | Value.  | No.     | Value.  | No.   | Value.  |
| Boats .....                  | 13          | \$240  | 14    | \$255  | 67        | \$3,055 | 66    | \$2,790 | 140     | \$6,179 | 131   | \$5,658 |
| Apparatus — shore fisheries: |             |        |       |        |           |         |       |         |         |         |       |         |
| Selnes .....                 | 3           | 165    | 3     | 165    |           |         |       |         | 10      | 1,415   | 11    | 1,475   |
| Gill nets .....              |             |        |       |        | 480       | 2,960   | 516   | 2,784   | 136     | 9,130   | 132   | 7,655   |
| Fyke nets .....              | 48          | 156    | 44    | 140    | 72        | 854     | 67    | 780     | 146     | 604     | 145   | 598     |
| Eel pots .....               |             |        |       |        | 18        | 20      | 16    | 18      |         |         |       |         |
| Shore property .....         |             | 160    |       | 120    |           | 895     |       | 875     |         | 2,610   |       | 2,645   |
| Total .....                  |             | 721    |       | 680    |           | 7,784   |       | 7,247   |         | 19,938  |       | 18,031  |

Table showing, by counties, the yield of the fisheries of New York in 1897 and 1898.

| Species.            | Albany. |        |        |         | Columbia. |         |         |        |
|---------------------|---------|--------|--------|---------|-----------|---------|---------|--------|
|                     | 1897.   |        | 1898.  |         | 1897.     |         | 1898.   |        |
|                     | Lbs.    | Value. | Lbs.   | Value.  | Lbs.      | Value.  | Lbs.    | Value. |
| Alewives .....      | 61,600  | \$853  | 83,000 | \$1,137 | 84,640    | \$1,156 | 62,400  | \$970  |
| Carp .....          | 1,900   | 110    | 1,520  | 91      | 250       | 14      | 350     | 20     |
| Cat-fish .....      | 3,400   | 264    | 3,230  | 254     | 7,800     | 604     | 8,800   | 804    |
| Eels .....          | 700     | 48     | 635    | 48      | 90        | 7       | 100     | 8      |
| Perch, white .....  | 1,880   | 96     | 1,500  | 96      | 170       | 8       | 140     | 7      |
| Perch, yellow ..... |         |        |        |         | 3,100     | 121     | 3,040   | 117    |
| Shad .....          | 256     | 13     | 758    | 40      | 47,438    | 2,007   | 60,244  | 2,304  |
| Striped bass .....  | 1,030   | 142    | 1,090  | 140     | 260       | 37      | 380     | 46     |
| Sturgeon .....      |         |        |        |         | 300       | 12      | 220     | 9      |
| Suckers .....       | 1,000   | 50     | 850    | 43      | 3,950     | 118     | 4,250   | 128    |
| Total .....         | 71,766  | 1,576  | 92,583 | 1,849   | 147,998   | 4,084   | 139,924 | 4,413  |

| Species.           | Dutchess. |         |         |         | Greene. |         |         |         |
|--------------------|-----------|---------|---------|---------|---------|---------|---------|---------|
|                    | 1897.     |         | 1898.   |         | 1897.   |         | 1898.   |         |
|                    | Lbs.      | Value.  | Lbs.    | Value.  | Lbs.    | Value.  | Lbs.    | Value.  |
| Alewives .....     | 155,326   | \$1,320 | 130,800 | \$1,412 | 256,640 | \$3,299 | 298,000 | \$3,736 |
| Carp .....         | 1,150     | 47      | 1,430   | 58      | 350     | 17      | 610     | 30      |
| Cat-fish .....     | 5,200     | 395     | 5,450   | 396     | 3,490   | 247     | 3,270   | 238     |
| Eels .....         | 600       | 48      | 610     | 48      |         |         |         |         |
| Perch, white ..... | 2,450     | 87      | 2,450   | 100     | 1,330   | 87      | 1,040   | 70      |
| Shad .....         | 387,710   | 11,068  | 355,488 | 10,876  | 52,716  | 2,389   | 55,151  | 2,273   |
| Striped bass ..... | 100       | 12      | 180     | 24      | 280     | 34      | 400     | 48      |
| Sturgeon .....     | 29,767    | 1,710   | 11,441  | 1,028   | 3,520   | 231     | 1,125   | 56      |
| Suckers .....      | 300       | 10      | 300     | 11      | 650     | 32      | 580     | 29      |
| Total .....        | 582,603   | 14,697  | 508,149 | 13,953  | 318,976 | 6,336   | 360,176 | 6,480   |

| Species.              | Richmond. |         |           |         | Rockland. |        |         |        |
|-----------------------|-----------|---------|-----------|---------|-----------|--------|---------|--------|
|                       | 1897.     |         | 1898.     |         | 1897.     |        | 1898.   |        |
|                       | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.      | Value. | Lbs.    | Value. |
| Alewives .....        | 3,520     | \$44    |           |         |           |        |         |        |
| Carp .....            |           |         |           |         | 150       | \$6    | 420     | \$19   |
| Cat-fish .....        | 400       | 31      |           |         | 4,200     | 272    | 5,000   | 360    |
| Cod .....             | 111,000   | 3,370   | 19,650    | \$834   |           |        |         |        |
| Eels .....            | 2,380     | 181     | 2,100     | 168     | 1,800     | 126    | 1,600   | 112    |
| Perch, white .....    | 260       | 15      |           |         | 3,800     | 258    | 4,300   | 294    |
| Shad .....            | 167,725   | 5,675   | 157,567   | 6,884   | 117,044   | 3,982  | 110,947 | 3,875  |
| Striped bass .....    | 300       | 36      |           |         | 5,720     | 752    | 3,000   | 360    |
| Sturgeon .....        | 800       | 22      | 640       | 21      | 2,000     | 86     | 2,100   | 98     |
| Suckers .....         |           |         |           |         | 1,100     | 47     | 1,220   | 51     |
| Lobsters .....        | 43,200    | 4,268   | 39,968    | 4,053   |           |        |         |        |
| Clams, hard .....     | 108,920   | 12,625  | 87,880    | 10,233  |           |        |         |        |
| Oysters, market ..... | 2,590,280 | 353,045 | 2,337,895 | 326,807 |           |        |         |        |
| Oysters, seed .....   | 238,350   | 13,615  | 567,350   | 32,620  |           |        |         |        |
| Scallops .....        | 20,400    | 2,210   | 22,800    | 2,470   |           |        |         |        |
| Total .....           | 3,287,535 | 395,137 | 3,235,850 | 384,090 | 135,814   | 5,531  | 128,587 | 5,169  |

Table showing, by counties, the yield of fisheries of New York in 1897 and 1898—Cont'd.

| Species.                  | Kings.     |         |           |         | New York.  |           |            |           |
|---------------------------|------------|---------|-----------|---------|------------|-----------|------------|-----------|
|                           | 1897.      |         | 1898.     |         | 1897.      |           | 1898.      |           |
|                           | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.       | Value.    | Lbs.       | Value.    |
| Alewives.....             | 2,000      | \$20    | 19,200    | \$555   |            |           |            |           |
| Blue-fish.....            | 145,860    | 7,336   | 173,450   | 8,699   | 9,899,465  | \$336,059 | 10,222,689 | \$340,051 |
| Bonito.....               |            |         |           |         | 4,703      | 139       | 5,856      | 159       |
| Cod.....                  | 191,890    | 5,430   | 196,830   | 5,544   | 1,182,410  | 38,300    | 1,265,150  | 42,712    |
| Eels.....                 | 101,520    | 8,867   | 96,650    | 8,362   |            |           |            |           |
| Flounders.....            | 9,510      | 393     | 16,170    | 608     | 1,045      | 41        | 1,179      | 41        |
| Haddock.....              | 6,650      | 178     | 7,400     | 194     | 78,870     | 2,637     | 75,383     | 2,548     |
| Hake.....                 | 400        | 15      | 300       | 9       | 1,000      | 20        | 1,190      | 28        |
| Mackerel.....             | 1,080      | 83      | 1,200     | 96      | 9,000      | 720       | 8,500      | 680       |
| Menhaden.....             | 13,206,752 | 33,043  | 14,700    | 98      |            |           |            |           |
| Scup.....                 |            |         |           |         | 45,200     | 1,266     | 85,555     | 1,892     |
| Sea bass.....             | 1,550      | 106     | 1,525     | 104     | 166,095    | 6,838     | 201,612    | 8,117     |
| Shad.....                 | 182,029    | 6,257   | 128,170   | 4,593   |            |           |            |           |
| Sheepshead.....           | 300        | 18      |           |         |            |           |            |           |
| Snappers, red.....        |            |         |           |         | 92,000     | 3,680     | 76,000     | 3,040     |
| Squeteague.....           | 21,300     | 772     | 86,300    | 1,414   | 1,100      | 13        | 2,241      | 12        |
| Striped bass.....         | 2,700      | 284     | 2,810     | 297     |            |           |            |           |
| Tautog.....               | 380        | 19      | 450       | 23      |            |           |            |           |
| Tomcod or frost-fish..... | 400        | 18      | 200       | 8       |            |           |            |           |
| Other fish.....           |            |         |           |         |            |           | 98         | 4         |
| Crabs, soft.....          | 680        | 102     | 480       | 114     |            |           |            |           |
| Lobsters.....             | 12,860     | 1,193   | 26,240    | 2,362   | 230,420    | 16,445    | 188,410    | 15,073    |
| Clams, hard.....          | 206,504    | 24,980  | 214,240   | 26,476  |            |           |            |           |
| Clams, soft.....          | 373,000    | 27,110  | 446,650   | 33,104  |            |           |            |           |
| Oysters, market.....      | 2,201,500  | 322,755 | 1,937,670 | 282,210 | 528,500    | 61,080    | 486,150    | 54,162    |
| Mussels.....              | 30,000     | 960     |           |         |            |           |            |           |
| Total.....                | 16,698,865 | 439,939 | 3,370,635 | 374,870 | 12,239,808 | 467,238   | 12,620,013 | 468,519   |

| Species.                  | Queens.   |         |           |          | Suffolk.   |           |             |           |
|---------------------------|-----------|---------|-----------|----------|------------|-----------|-------------|-----------|
|                           | 1897.     |         | 1898.     |          | 1897.      |           | 1898.       |           |
|                           | Lbs.      | Value.  | Lbs.      | Value.   | Lbs.       | Value.    | Lbs.        | Value.    |
| Alewives.....             | 3,944     | \$86    |           |          | 48,210     | \$960     | 26,230      | \$524     |
| Blue-fish.....            | 485,400   | 24,097  | 368,950   | \$18,532 | 615,699    | 23,535    | 449,344     | 19,885    |
| Bonito.....               |           |         |           |          | 38,120     | 1,964     | 57,388      | 1,559     |
| Butter-fish.....          | 800       | 64      |           |          | 727,816    | 26,061    | 470,836     | 15,488    |
| Carp.....                 |           |         |           |          | 162,500    | 6,500     | 223,250     | 8,930     |
| Cat-fish.....             |           |         |           |          | 41,000     | 2,002     | 48,150      | 1,883     |
| Cod.....                  | 143,500   | 5,490   | 130,000   | 4,950    | 487,216    | 17,284    | 427,807     | 14,981    |
| Eels.....                 | 90,410    | 6,417   | 79,510    | 5,620    | 205,680    | 12,163    | 198,290     | 11,789    |
| Flounders.....            | 106,700   | 4,243   | 96,900    | 3,833    | 990,802    | 30,497    | 762,434     | 23,973    |
| Haddock.....              | 11,800    | 382     | 12,500    | 425      | 56,000     | 1,707     | 77,600      | 2,381     |
| Hake.....                 |           |         |           |          | 22,900     | 573       | 31,131      | 647       |
| King-fish.....            |           |         |           |          | 10,440     | 872       | 11,854      | 978       |
| Mackerel.....             | 600       | 72      | 950       | 118      | 130,132    | 6,103     | 73,808      | 5,314     |
| Menhaden.....             | 16,800    | 112     | 18,000    | 120      | 47,382,160 | 114,542   | 163,247,645 | 405,270   |
| Perch, white.....         |           |         |           |          | 38,800     | 1,940     | 34,600      | 1,730     |
| Pike.....                 |           |         |           |          |            |           | 1,800       | 90        |
| Pollock.....              |           |         |           |          | 3,000      | 90        | 4,635       | 130       |
| Scup.....                 | 10,750    | 488     | 8,500     | 390      | 690,423    | 15,157    | 551,342     | 11,820    |
| Sea bass.....             |           |         |           |          | 186,796    | 9,301     | 108,044     | 5,769     |
| Shad.....                 | 8,385     | 804     | 2,347     | 160      | 20,040     | 864       | 5,223       | 233       |
| Sheepshead.....           | 4,600     | 234     | 3,150     | 174      |            |           |             |           |
| Skates.....               |           |         |           |          | 150,000    | 100       | 127,500     | 85        |
| Spanish mackerel.....     | 900       | 210     | 1,310     | 259      | 10,460     | 1,615     | 11,697      | 1,802     |
| Squeteague.....           | 397,900   | 12,346  | 299,550   | 9,227    | 2,141,227  | 56,343    | 1,688,839   | 43,053    |
| Striped bass.....         | 15,450    | 2,046   | 11,150    | 1,389    | 63,165     | 7,658     | 49,135      | 5,836     |
| Sturgeon.....             |           |         |           |          | 340,860    | 21,511    | 353,969     | 31,872    |
| Tautog.....               |           |         | 30        | 2        | 48,801     | 1,515     | 50,780      | 1,582     |
| Tomcod or frost-fish..... |           |         |           |          | 40,600     | 894       | 34,500      | 691       |
| Whiting.....              |           |         |           |          | 9,000      | 250       | 15,473      | 449       |
| Other fish.....           |           |         |           |          | 997,200    | 2,286     | 847,200     | 1,752     |
| Caviar.....               |           |         |           |          |            |           | 17,256      | 11,992    |
| Crabs, hard.....          | 26,667    | 240     | 21,333    | 180      | 282,666    | 2,233     | 225,300     | 1,613     |
| Crabs, soft.....          | 88,000    | 1,770   | 86,280    | 1,650    | 15,167     | 1,630     | 14,063      | 1,630     |
| Lobsters.....             |           |         |           |          | 72,440     | 6,514     | 58,480      | 5,683     |
| Squid.....                |           |         |           |          | 151,000    | 3,393     | 276,257     | 6,188     |
| Clams, hard.....          | 435,520   | 64,990  | 434,832   | 65,667   | 587,760    | 78,115    | 631,040     | 85,283    |
| Clams, soft.....          | 231,000   | 15,655  | 231,300   | 15,747   | 106,000    | 7,348     | 105,350     | 7,384     |
| Oysters, market.....      | 3,553,550 | 553,475 | 2,971,822 | 480,511  | 4,425,750  | 633,935   | 4,909,625   | 698,258   |
| Oysters, seed.....        | 174,160   | 11,338  | 137,620   | 10,637   | 898,100    | 68,990    | 896,105     | 77,485    |
| Scallops.....             | 9,000     | 750     | 12,000    | 1,000    | 856,560    | 77,162    | 618,378     | 49,960    |
| Shells.....               |           |         |           |          | 5,310,000  | 4,875     | 5,460,000   | 4,550     |
| Total.....                | 5,815,836 | 705,309 | 4,928,034 | 620,591  | 68,364,490 | 1,248,422 | 183,202,358 | 1,570,522 |

Table showing, by counties, the yield of fisheries of New York in 1897 and 1898—Cont'd.

| Species.          | Orange. |       |         |       | Putnam. |        |        |        | Rensselaer. |         |         |         |
|-------------------|---------|-------|---------|-------|---------|--------|--------|--------|-------------|---------|---------|---------|
|                   | 1897.   |       | 1898.   |       | 1897.   |        | 1898.  |        | 1897.       |         | 1898.   |         |
|                   | Lbs.    | Val.  | Lbs.    | Val.  | Lbs.    | Value. | Lbs.   | Value. | Lbs.        | Value.  | Lbs.    | Value.  |
| Alewives.....     | 13,600  | \$136 | 18,400  | \$192 |         |        |        |        | 89,600      | \$1,077 | 114,400 | \$1,324 |
| Carp.....         | 3,800   | 154   | 4,500   | 180   | 4,000   | \$160  | 5,000  | \$200  | 110         | 6       | 140     | 8       |
| Cat-fish.....     | 3,000   | 216   | 2,600   | 182   |         |        |        |        | 2,400       | 169     | 2,000   | 141     |
| Eels.....         | 250     | 15    | 200     | 12    |         |        |        |        |             |         |         |         |
| Perch, white..... | 800     | 48    | 700     | 42    |         |        |        |        | 800         | 49      | 680     | 42      |
| Shad.....         | 80,450  | 3,043 | 93,243  | 3,443 | 15,225  | 554    | 14,625 | 550    | 180         | 10      | 406     | 22      |
| Striped bass..... | 750     | 90    | 1,000   | 125   |         |        |        |        | 640         | 86      | 1,000   | 134     |
| Sturgeon.....     | 21,050  | 1,180 | 6,600   | 516   | 2,120   | 120    |        |        |             |         |         |         |
| Suckers.....      | 950     | 40    | 1,000   | 42    | 500     | 20     | 400    | 16     | 800         | 46      | 550     | 30      |
| Total..           | 124,650 | 4,922 | 128,243 | 4,734 | 21,845  | 854    | 20,025 | 766    | 94,530      | 1,443   | 119,176 | 1,701   |

| Species.             | Ulster. |         |         |         | Westchester. |        |         |        |
|----------------------|---------|---------|---------|---------|--------------|--------|---------|--------|
|                      | 1897.   |         | 1898.   |         | 1897.        |        | 1898.   |        |
|                      | Lbs.    | Value.  | Lbs.    | Value.  | Lbs.         | Value. | Lbs.    | Value. |
| Alewives.....        | 232,600 | \$2,357 | 273,000 | \$2,748 | 3,320        | \$59   | 2,680   | \$54   |
| Carp.....            | 1,150   | 56      | 1,800   | 70      | 30,200       | 1,248  | 47,380  | 1,937  |
| Cat-fish.....        | 8,750   | 610     | 12,600  | 1,008   | 10,450       | 846    | 11,240  | 885    |
| Cod.....             | 300     | 5       | 700     | 11      |              |        |         |        |
| Eels.....            |         |         | 400     | 40      | 17,300       | 1,354  | 16,850  | 1,310  |
| Perch, white.....    | 4,100   | 207     | 4,900   | 260     | 8,100        | 449    | 10,000  | 604    |
| Shad.....            | 523,752 | 16,367  | 541,433 | 16,541  | 281,278      | 9,918  | 303,375 | 10,951 |
| Striped bass.....    | 600     | 72      | 750     | 81      | 25,470       | 2,928  | 10,900  | 1,285  |
| Sturgeon.....        | 3,700   | 190     | 9,600   | 695     | 23,430       | 1,186  | 5,360   | 286    |
| Suckers.....         | 3,000   | 120     | 3,300   | 142     | 3,800        | 152    | 5,100   | 266    |
| Sun-fish.....        |         |         | 2,000   | 100     |              |        |         |        |
| Lobsters.....        |         |         |         |         | 22,100       | 3,038  | 19,280  | 3,064  |
| Clams, hard.....     |         |         |         |         | 133,600      | 18,220 | 135,200 | 18,293 |
| Clams, soft.....     |         |         |         |         | 37,000       | 4,840  | 34,500  | 4,562  |
| Oysters, market..... |         |         |         |         | 260,050      | 30,705 | 180,075 | 21,659 |
| Oysters, seed.....   |         |         |         |         | 16,800       | 1,180  | 11,200  | 680    |
| Total.....           | 777,952 | 19,984  | 850,483 | 21,696  | 872,898      | 76,123 | 793,140 | 65,836 |

THE SHAD FISHERY.

Compared with other fisheries of New York State, the shad fishery bears a relatively less important position than in any other of the Middle Atlantic States. Most of the catch in this State is taken from the Hudson River. The principal shad counties are Ulster, Dutchess, and Westchester, which yielded more in 1897 and 1898 than all other counties combined, as shown by the following table:

| Counties.        | 1897.     |        | 1898.     |        |
|------------------|-----------|--------|-----------|--------|
|                  | No.       | Value. | No.       | Value. |
| Albany.....      | 68        | \$13   | 202       | \$40   |
| Columbia.....    | 12,650    | 2,007  | 16,065    | 2,304  |
| Dutchess.....    | 103,116   | 11,068 | 94,799    | 10,876 |
| Greene.....      | 14,526    | 2,389  | 14,740    | 2,273  |
| Kings.....       | 48,548    | 6,257  | 34,179    | 4,593  |
| Orange.....      | 21,720    | 3,043  | 24,865    | 3,443  |
| Putnam.....      | 4,060     | 554    | 3,900     | 550    |
| Queens.....      | 2,236     | 804    | 626       | 160    |
| Rensselaer.....  | 48        | 10     | 108       | 22     |
| Richmond.....    | 45,268    | 5,675  | 42,018    | 6,884  |
| Rockland.....    | 31,215    | 3,984  | 29,586    | 3,875  |
| Suffolk.....     | 5,344     | 864    | 1,393     | 233    |
| Ulster.....      | 143,000   | 16,367 | 145,230   | 16,541 |
| Westchester..... | 74,474    | 9,918  | 80,900    | 10,951 |
| Total.....       | 1,506,273 | 62,953 | 2,488,611 | 62,745 |

<sup>1</sup>1,884,228 pounds. <sup>2</sup>1,823,977 pounds.

## THE PRODUCTS BY DIFFERENT FORMS OF APPARATUS.

The yield of the fisheries according to the apparatus used is given in detail for each form of apparatus in the following series of tables. As regards value of the product, dredges, tongs, and rakes are the most important forms of apparatus, their catch in 1898 being valued at \$2,310,876, consisting chiefly of oysters, hard clams, and soft clams, and, to a less extent, of scallops, shells, and hard crabs. The shells reported in these returns are the shells of jingles and quarter-decks, which are caught in Peconic Bay for sale to Connecticut oyster-growers.

Of the forms of apparatus employed in taking fish proper the seine is the most important, although in value of the product it is nearly equaled by lines, the value of the yield of the former in 1898 being \$456,381, and of the latter \$441,251. The principal species taken by means of seines is the menhaden, the yield of which was 159,992,645 pounds, worth \$399,558. Practically all of these were used in the manufacture of oil and fertilizer. The yield of food-fish by seines is very small, amounting in 1898 to only 1,892,847 pounds, worth \$56,823, and consisting principally of shad, carp, squeteague, striped bass, flounders, etc.

Lines constitute the most important form of apparatus for the capture of food-fish in New York State, the yield in 1898 aggregating \$441,251, or more than the yield of food fish proper in all other apparatus in the State. The most important species in the line fishery is the blue-fish, the yield of which in 1898 was valued at \$353,160, or 80 per cent of the total line catch. Cod ranks second in importance as regards the value of the catch, amounting to \$67,725, or over three times as much as all other species taken, exclusive of blue-fish. The other species consist principally of sea bass, haddock, and red snapper.

The gill-net fishery is prosecuted in nearly every county bordering the coastal waters, and next to the line fishery it yields the greatest return of food-fish, amounting in 1898 to 4,849,397 pounds, worth \$144,607. Shad, sturgeon, and squeteague made up the principal items, the yield of shad being 1,509,737 pounds, worth \$52,736; of sturgeon, 406,011 pounds, worth \$46,468, including the caviar; and of squeteague, 351,255 pounds, worth \$12,225.

The pound-net fishery, which is prosecuted in Suffolk, Kings, Queens, and Richmond counties, but principally in the first named, shows somewhat of a decrease from the conditions of 1891, when the yield was 9,953,928 pounds, worth \$125,719. In 1898 the yield was 6,219,601 pounds, worth \$108,939, the most important items being squeteague, 1,486,545 pounds, for which the fishermen received \$33,735; butter-fish, 461,436 pounds, worth \$15,251; flounders, 439,836 pounds, worth \$13,367; and scup, 536,532 pounds, worth \$11,348.

The principal fyke-net fishery in New York is for flounders, etc., in the vicinity of Sag Harbor and Springs, Suffolk County, and for shad



in Richmond and Kings counties. The total fyke-net yield is comparatively small, aggregating 638,880 pounds, with a valuation of \$24,226. The more important items in this yield are flounders, 316,000 pounds, worth \$10,229; cat-fish, 79,510 pounds, worth \$4,671; and shad, 35,130 pounds, worth \$1,356.

The eel-pot and spear fisheries yielded 374,685 pounds of eels and 1,160 pounds of flounders, the value of the former being \$25,982, and of the latter \$62. These fisheries are carried on principally in Suffolk, Kings, and Queens counties.

Notwithstanding the decrease in the lobster yield in most of the New England States, the returns for that fishery in New York show a considerable increase, due to an increase in the number of pots used rather than an increased abundance of that crustacean.

The following tables, relating to the years 1897 and 1898, present, by counties, detailed statistics of the yield by each form of apparatus:

*Table showing, by counties, the yield of the seine fisheries of New York in 1897 and 1898.*

| Species.                   | Albany. |       |        |         | Columbia. |       |        |       | Dutchess. |       |         |       |
|----------------------------|---------|-------|--------|---------|-----------|-------|--------|-------|-----------|-------|---------|-------|
|                            | 1897.   |       | 1898.  |         | 1897.     |       | 1898.  |       | 1897.     |       | 1898.   |       |
|                            | Lbs.    | Val.  | Lbs.   | Val.    | Lbs.      | Val.  | Lbs.   | Val.  | Lbs.      | Val.  | Lbs.    | Val.  |
| Shore fisheries:           |         |       |        |         |           |       |        |       |           |       |         |       |
| Alewives .....             | 61,600  | \$853 | 83,000 | \$1,137 | 70,800    | \$991 | 56,800 | \$900 | 106,526   | \$872 | 76,800  | \$860 |
| Carp .....                 | 1,500   | 90    | 1,100  | 70      | 250       | 14    | 350    | 20    | 50        | 3     | 80      | 4     |
| Cat-fish .....             | 900     | 64    | 1,030  | 78      | 2,400     | 192   | 3,000  | 340   | 200       | 15    | 250     | 17    |
| Eels .....                 | 300     | 18    | 160    | 12      | 90        | 7     | 100    | 8     |           |       |         |       |
| Perch, white and yellow... | 1,080   | 48    | 800    | 40      | 270       | 14    | 180    | 9     | 50        | 3     | 100     | 6     |
| Shad .....                 | 256     | 13    | 758    | 40      | 20,775    | 913   | 21,225 | 761   | 31,150    | 824   | 29,813  | 816   |
| Striped bass .....         | 430     | 60    | 290    | 42      | 60        | 7     | 120    | 14    |           |       |         |       |
| Sturgeon .....             |         |       |        |         | 300       | 12    | 220    | 9     |           |       |         |       |
| Total .....                | 66,066  | 1,146 | 87,138 | 1,419   | 94,945    | 2,150 | 81,995 | 2,061 | 137,976   | 1,717 | 107,043 | 1,703 |

| Species.                     | Kings.*    |          | New York. |         |        |         | Queens. |         |         |         |
|------------------------------|------------|----------|-----------|---------|--------|---------|---------|---------|---------|---------|
|                              | 1897.      |          | 1897.     |         | 1898.  |         | 1897.   |         | 1898.   |         |
|                              | Lbs.       | Value.   | Lbs.      | Value.  | Lbs.   | Value.  | Lbs.    | Value.  | Lbs.    | Value.  |
| Vessel fisheries:            |            |          |           |         |        |         |         |         |         |         |
| Blue-fish .....              |            |          |           |         |        |         | 39,800  | \$1,960 | 23,000  | \$1,210 |
| Flounders .....              |            |          |           |         |        |         | 31,400  | 1,450   | 22,000  | 970     |
| Menhaden .....               | 13,200,000 | \$33,000 |           |         |        |         |         |         |         |         |
| Scup .....                   |            |          | 42,000    | \$1,170 | 36,760 | \$1,070 | 2,550   | 115     | 2,600   | 119     |
| Sea bass .....               |            |          | 49,000    | 1,994   | 45,496 | 1,765   |         |         |         |         |
| Sheepshead .....             |            |          |           |         |        |         | 1,100   | 59      | 950     | 54      |
| Spanish mackerel .....       |            |          |           |         |        |         | 50      | 10      | 100     | 18      |
| Squeteague .....             |            |          |           |         |        |         | 34,000  | 1,050   | 23,500  | 645     |
| Striped bass .....           |            |          |           |         |        |         | 300     | 41      | 500     | 74      |
| Total .....                  | 13,200,000 | 33,000   | 91,000    | 3,164   | 82,256 | 2,835   | 109,200 | 4,685   | 72,650  | 3,090   |
| Shore fisheries:             |            |          |           |         |        |         |         |         |         |         |
| Blue-fish .....              |            |          |           |         |        |         | 160,100 | 8,012   | 87,350  | 4,512   |
| Eels .....                   |            |          |           |         |        |         | 700     | 62      | 3,450   | 280     |
| Flounders .....              |            |          |           |         |        |         | 75,300  | 2,793   | 74,900  | 2,863   |
| Mackerel .....               |            |          |           |         |        |         |         |         | 100     | 16      |
| Menhaden .....               |            |          |           |         |        |         | 16,800  | 112     | 18,000  | 120     |
| Scup .....                   |            |          |           |         |        |         | 8,200   | 373     | 5,900   | 271     |
| Sheepshead .....             |            |          |           |         |        |         | 3,500   | 175     | 2,200   | 120     |
| Spanish mackerel .....       |            |          |           |         |        |         | 350     | 80      | 480     | 95      |
| Squeteague .....             |            |          |           |         |        |         | 236,600 | 7,324   | 156,200 | 4,893   |
| Striped bass .....           |            |          |           |         |        |         | 13,950  | 1,861   | 10,650  | 1,315   |
| Total .....                  |            |          |           |         |        |         | 515,500 | 20,792  | 359,230 | 14,485  |
| Total vessel and shore ..... | 13,200,000 | 33,000   | 91,000    | 3,164   | 82,256 | 2,835   | 624,700 | 25,477  | 431,880 | 17,575  |

\*Statistics for 1898 can not be given.



Table showing the yield of the seine fisheries of New York in 1897 and 1898—Continued.

| Species.                   | Greene. |         |         |         | Orange. |       |       |       | Putnam. |       |       |       |
|----------------------------|---------|---------|---------|---------|---------|-------|-------|-------|---------|-------|-------|-------|
|                            | 1897.   |         | 1898.   |         | 1897.   |       | 1898. |       | 1897.   |       | 1898. |       |
|                            | Lbs.    | Val.    | Lbs.    | Val.    | Lbs.    | Val.  | Lbs.  | Val.  | Lbs.    | Val.  | Lbs.  | Val.  |
| Shore fisheries:           |         |         |         |         |         |       |       |       |         |       |       |       |
| Alewives .....             | 190,000 | \$2,456 | 217,200 | \$2,738 |         |       |       |       |         |       |       |       |
| Carp .....                 | 300     | 15      | 510     | 25      | 3,600   | \$146 | 4,200 | \$168 | 4,000   | \$160 | 5,000 | \$200 |
| Cat-fish .....             | 1,490   | 117     | 1,470   | 116     |         |       |       |       |         |       |       |       |
| Perch, white and yellow .. | 530     | 31      | 440     | 28      |         |       |       |       |         |       |       |       |
| Shad .....                 | 49,416  | 2,146   | 50,851  | 2,051   |         |       |       |       |         |       |       |       |
| Striped bass .....         | 180     | 22      | 200     | 24      |         |       |       |       |         |       |       |       |
| Sturgeon .....             | 200     | 8       | 200     | 8       |         |       |       |       |         |       |       |       |
| Suckers .....              | 50      | 2       | 80      | 4       | 450     | 18    | 500   | 20    | 500     | 20    | 400   | 16    |
| Total .....                | 242,166 | 4,797   | 270,951 | 4,994   | 4,050   | 164   | 4,700 | 188   | 4,500   | 180   | 5,400 | 216   |

| Species.                   | Ulster. |         |         |         | Westchester. |       |        |       | Rensselaer. |         |         |         |
|----------------------------|---------|---------|---------|---------|--------------|-------|--------|-------|-------------|---------|---------|---------|
|                            | 1897.   |         | 1898.   |         | 1897.        |       | 1898.  |       | 1897.       |         | 1898.   |         |
|                            | Lbs.    | Val.    | Lbs.    | Val.    | Lbs.         | Val.  | Lbs.   | Val.  | Lbs.        | Val.    | Lbs.    | Val.    |
| Shore fisheries:           |         |         |         |         |              |       |        |       |             |         |         |         |
| Alewives .....             | 171,760 | \$1,768 | 179,600 | \$1,824 | 1,000        | \$30  | 1,000  | \$30  | 89,600      | \$1,077 | 114,400 | \$1,324 |
| Carp .....                 |         |         |         |         | 30,000       | 1,240 | 46,980 | 1,921 | 60          | 3       | 60      | 3       |
| Cat-fish .....             | 250     | 20      | 400     | 32      | 600          | 60    | 580    | 50    | 600         | 43      | 500     | 36      |
| Perch, white and yellow .. | 100     | 7       |         |         | 1,600        | 96    | 2,000  | 120   | 150         | 10      | 180     | 12      |
| Shad .....                 | 133,916 | 3,953   | 157,058 | 3,968   |              |       | 750    | 40    | 180         | 10      | 406     | 22      |
| Striped bass .....         | 300     | 27      | 450     | 36      | 3,300        | 384   | 3,050  | 352   | 340         | 48      | 350     | 50      |
| Sturgeon .....             | 580     | 28      | 240     | 16      | 500          | 25    | 600    | 30    |             |         |         |         |
| Suckers .....              |         |         |         |         | 2,500        | 100   | 2,700  | 110   |             |         |         |         |
| Total .....                | 306,906 | 5,803   | 337,748 | 5,876   | 39,500       | 1,935 | 57,660 | 2,653 | 90,930      | 1,191   | 115,896 | 1,447   |

| Species.                   | Suffolk.   |         |             |         | Total.     |         |             |         |
|----------------------------|------------|---------|-------------|---------|------------|---------|-------------|---------|
|                            | 1897.      |         | 1898.       |         | 1897.      |         | 1898.       |         |
|                            | Lbs.       | Value.  | Lbs.        | Value.  | Lbs.       | Value.  | Lbs.        | Value.  |
| Vessel fisheries:          |            |         |             |         |            |         |             |         |
| Blue-fish .....            | 1,200      | \$32    | 1,300       | \$91    | 41,000     | \$2,042 | 24,300      | \$1,301 |
| Flounders .....            |            |         |             |         | 31,400     | 1,450   | 22,000      | 970     |
| Menhaden .....             | 42,884,160 | 106,907 | 159,590,645 | 398,478 | 56,084,160 | 139,907 | 159,590,645 | 398,478 |
| Scup .....                 |            |         |             |         | 44,550     | 1,285   | 39,360      | 1,189   |
| Sea bass .....             |            |         |             |         | 49,000     | 1,994   | 45,496      | 1,765   |
| Sheepshead .....           |            |         |             |         | 1,100      | 59      | 950         | 54      |
| Spanish mack'l ..          |            |         |             |         | 50         | 10      | 100         | 18      |
| Squeteague .....           | 20,000     | 525     | 15,000      | 440     | 54,000     | 1,575   | 38,500      | 1,085   |
| Striped bass .....         | 1,370      | 165     | 2,000       | 245     | 1,670      | 206     | 2,500       | 319     |
| Total .....                | 42,906,730 | 107,679 | 159,608,945 | 399,254 | 56,306,930 | 148,528 | 159,763,851 | 405,179 |
| Shore fisheries:           |            |         |             |         |            |         |             |         |
| Alewives .....             |            |         |             |         | 691,286    | 8,047   | 728,800     | 8,813   |
| Blue-fish .....            | 250        | 13      | 100         | 6       | 160,350    | 8,025   | 87,450      | 4,518   |
| Carp .....                 | 151,000    | 6,040   | 212,000     | 8,480   | 190,760    | 7,711   | 270,280     | 10,891  |
| Cat-fish .....             | 7,700      | 273     | 8,700       | 310     | 14,140     | 784     | 15,930      | 979     |
| Cod .....                  | 6,300      | 246     | 3,800       | 153     | 6,300      | 246     | 3,800       | 153     |
| Eels .....                 | 6,400      | 374     | 7,900       | 466     | 7,490      | 461     | 11,610      | 766     |
| Flounders .....            | 5,200      | 208     | 6,600       | 260     | 80,500     | 3,001   | 81,500      | 3,123   |
| Haddock .....              | 400        | 16      | 400         | 16      | 400        | 16      | 400         | 16      |
| Mackerel .....             |            |         |             |         |            |         | 100         | 16      |
| Menhaden .....             | 300,000    | 750     | 384,000     | 960     | 316,800    | 862     | 402,000     | 1,080   |
| Perch, white and yellow .. | 20,500     | 1,025   | 24,500      | 1,225   | 24,280     | 1,234   | 28,200      | 1,440   |
| Scup .....                 |            |         |             |         | 8,200      | 373     | 5,900       | 271     |
| Shad .....                 |            |         |             |         | 235,693    | 7,859   | 260,861     | 7,698   |
| Sheepshead .....           |            |         |             |         | 3,500      | 175     | 2,200       | 120     |
| Spanish mack'l ..          |            |         |             |         | 350        | 80      | 480         | 95      |
| Squeteague .....           | 1,200      | 36      | 3,100       | 276     | 237,800    | 7,360   | 159,300     | 5,169   |
| Striped bass .....         | 40,400     | 5,122   | 26,580      | 3,368   | 58,960     | 7,531   | 41,690      | 5,201   |
| Sturgeon .....             |            |         |             |         | 1,580      | 73      | 1,260       | 63      |
| Suckers .....              |            |         |             |         | 3,500      | 140     | 3,680       | 150     |
| Other fish .....           | 22,200     | 986     | 16,200      | 640     | 22,200     | 986     | 16,200      | 640     |
| Total .....                | 561,550    | 15,089  | 693,880     | 16,160  | 2,064,089  | 54,964  | 2,121,641   | 51,202  |
| Total vessel and shore ..  | 43,468,280 | 122,768 | 160,302,825 | 415,414 | 58,371,019 | 203,492 | 161,885,492 | 456,381 |

## 214 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the yield of the gill-net fisheries of New York in 1897 and 1898.

| Species.         | Columbia. |       |        |       | Dutchess. |        |         |        | Greene. |       |        |       |
|------------------|-----------|-------|--------|-------|-----------|--------|---------|--------|---------|-------|--------|-------|
|                  | 1897.     |       | 1898.  |       | 1897.     |        | 1898.   |        | 1897.   |       | 1898.  |       |
|                  | Lbs.      | Val.  | Lbs.   | Val.  | Lbs.      | Val.   | Lbs.    | Val.   | Lbs.    | Val.  | Lbs.   | Val.  |
| Shore fisheries: |           |       |        |       |           |        |         |        |         |       |        |       |
| Alewives.....    | 13,840    | \$165 | 5,600  | \$70  | 48,800    | \$448  | 54,000  | \$552  | 66,640  | \$343 | 80,800 | \$998 |
| Shad.....        | 26,663    | 1,094 | 39,019 | 1,543 | 356,560   | 10,244 | 325,675 | 10,060 | 3,300   | 243   | 4,300  | 222   |
| Sturgeon.....    |           |       |        |       | 29,767    | 1,710  | 11,441  | 1,028  | 3,320   | 223   | 925    | 48    |
| Total.....       | 40,503    | 1,259 | 44,619 | 1,613 | 435,127   | 12,402 | 391,116 | 11,640 | 73,260  | 1,309 | 86,025 | 1,268 |

| Species.                 | New York. |       |       |       | Kings.  |       |         |       | Queens. |         |         |         |
|--------------------------|-----------|-------|-------|-------|---------|-------|---------|-------|---------|---------|---------|---------|
|                          | 1897.     |       | 1898. |       | 1897.   |       | 1898.   |       | 1897.   |         | 1898.   |         |
|                          | Lbs.      | Val.  | Lbs.  | Val.  | Lbs.    | Val.  | Lbs.    | Val.  | Lbs.    | Val.    | Lbs.    | Val.    |
| Vessel fisheries:        |           |       |       |       |         |       |         |       |         |         |         |         |
| Blue-fish.....           |           |       |       |       |         |       |         |       | 150,500 | \$7,525 | 132,000 | \$6,600 |
| Mackerel.....            | 9,000     | \$720 | 8,500 | \$680 |         |       |         |       | 400     | 48      | 500     | 60      |
| Spanish mackerel.....    |           |       |       |       |         |       |         |       |         |         | 300     | 60      |
| Squeteague.....          |           |       |       |       |         |       |         |       | 74,000  | 2,255   | 73,500  | 2,275   |
| Total.....               | 9,000     | 720   | 8,500 | 680   |         |       |         |       | 224,900 | 9,828   | 206,300 | 8,995   |
| Shore fisheries:         |           |       |       |       |         |       |         |       |         |         |         |         |
| Blue-fish.....           |           |       |       |       |         |       |         |       | 68,500  | 3,275   | 70,100  | 3,385   |
| Cod.....                 |           |       |       |       | 150     | \$10  | 80      | \$6   |         |         |         |         |
| Flounders.....           |           |       |       |       | 100     | 8     | 200     | 15    |         |         |         |         |
| Mackerel.....            |           |       |       |       |         |       |         |       | 200     | 24      | 350     | 42      |
| Shad.....                |           |       |       |       | 150,228 | 5,271 | 101,782 | 3,744 | 750     | 62      | 247     | 20      |
| Spanish mackerel.....    |           |       |       |       |         |       |         |       | 300     | 80      | 200     | 40      |
| Squeteague.....          |           |       |       |       |         |       |         |       | 45,000  | 1,395   | 42,000  | 1,270   |
| Total.....               |           |       |       |       | 150,478 | 5,289 | 102,062 | 3,765 | 114,750 | 4,836   | 112,897 | 4,757   |
| Total vessel and shore.. | 9,000     | 720   | 8,500 | 680   | 150,478 | 5,289 | 102,062 | 3,765 | 339,650 | 14,664  | 319,197 | 13,752  |

| Species.          | Richmond. |         |         |         | Rockland. |        |         |        |
|-------------------|-----------|---------|---------|---------|-----------|--------|---------|--------|
|                   | 1897.     |         | 1898.   |         | 1897.     |        | 1898.   |        |
|                   | Lbs.      | Value.  | Lbs.    | Value.  | Lbs.      | Value. | Lbs.    | Value. |
| Shore fisheries:  |           |         |         |         |           |        |         |        |
| Carp.....         |           |         |         |         |           |        | 200     | \$10   |
| Cat-fish.....     |           |         |         |         | 2,000     | \$140  | 3,000   | 240    |
| Perch.....        |           |         |         |         | 3,000     | 210    | 3,600   | 252    |
| Shad.....         | 132,213   | \$4,442 | 132,899 | \$5,795 | 117,044   | 3,984  | 110,947 | 3,875  |
| Striped bass..... |           |         |         |         | 5,120     | 680    | 2,000   | 240    |
| Sturgeon.....     |           |         |         |         | 1,600     | 64     | 1,800   | 81     |
| Suckers.....      |           |         |         |         | 800       | 32     | 900     | 36     |
| Total.....        | 132,213   | 4,442   | 132,899 | 5,795   | 129,564   | 5,110  | 122,447 | 4,734  |

| Species.         | Orange. |        |         |        | Putnam. |        |        |        |
|------------------|---------|--------|---------|--------|---------|--------|--------|--------|
|                  | 1897.   |        | 1898.   |        | 1897.   |        | 1898.  |        |
|                  | Lbs.    | Value. | Lbs.    | Value. | Lbs.    | Value. | Lbs.   | Value. |
| Shore fisheries: |         |        |         |        |         |        |        |        |
| Alewives.....    | 13,600  | \$136  | 18,400  | \$192  |         |        |        |        |
| Shad.....        | 80,450  | 3,043  | 93,243  | 3,443  | 15,225  | \$554  | 14,625 | \$550  |
| Sturgeon.....    | 21,050  | 1,180  | 6,600   | 516    | 2,120   | 120    |        |        |
| Total.....       | 115,100 | 4,359  | 118,243 | 4,151  | 17,345  | 674    | 14,625 | 550    |

Table showing the yield of the gill-net fisheries of New York in 1897 and 1898—Continued.

| Species.                | Ulster.        |               |                |               | Westchester.   |               |                |               |
|-------------------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|
|                         | 1897.          |               | 1898.          |               | 1897.          |               | 1898.          |               |
|                         | Lbs.           | Value.        | Lbs.           | Value.        | Lbs.           | Value.        | Lbs.           | Value.        |
| <b>Shore fisheries:</b> |                |               |                |               |                |               |                |               |
| Alewives.....           | 60,840         | \$589         | 93,400         | \$924         | 2,320          | \$29          | 1,680          | \$24          |
| Carp.....               |                |               |                |               |                |               | 100            | 4             |
| Cat-fish.....           |                |               |                |               | 3,800          | 278           | 3,500          | 245           |
| Cod.....                | 300            | 5             | 700            | 11            |                |               |                |               |
| Perch.....              |                |               |                |               | 5,600          | 308           | 7,200          | 444           |
| Shad.....               | 389,836        | 12,414        | 384,375        | 12,573        | 281,278        | 9,918         | 302,625        | 10,911        |
| Striped bass.....       |                |               |                |               | 16,300         | 1,840         | 3,550          | 416           |
| Sturgeon.....           | 3,120          | 162           | 9,360          | 679           | 22,630         | 1,148         | 4,660          | 252           |
| Suckers.....            |                |               |                |               | 500            | 20            | 1,800          | 132           |
| <b>Total.....</b>       | <b>454,096</b> | <b>13,170</b> | <b>487,835</b> | <b>14,187</b> | <b>332,428</b> | <b>13,541</b> | <b>325,115</b> | <b>12,428</b> |

| Species.                              | Suffolk.         |               |                  |               | Total.           |                |                  |                |
|---------------------------------------|------------------|---------------|------------------|---------------|------------------|----------------|------------------|----------------|
|                                       | 1897.            |               | 1898.            |               | 1897.            |                | 1898.            |                |
|                                       | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.             | Value.         | Lbs.             | Value.         |
| <b>Vessel fisheries:</b>              |                  |               |                  |               |                  |                |                  |                |
| Blue-fish.....                        | 110,352          | \$5,812       | 65,604           | \$3,704       | 260,852          | \$13,337       | 197,604          | \$10,304       |
| Bonito.....                           | 1,320            | 78            | 84               | 5             | 1,320            | 78             | 84               | 5              |
| Carp.....                             | 7,000            | 280           | 8,000            | 320           | 7,000            | 280            | 8,000            | 320            |
| Cat-fish.....                         | 500              | 20            | 400              | 16            | 500              | 20             | 400              | 16             |
| Flounders.....                        | 1,510            | 68            | 950              | 47            | 1,510            | 68             | 950              | 47             |
| Mackerel.....                         | 750              | 87            |                  |               | 10,150           | 855            | 9,000            | 740            |
| Menhaden.....                         | 774,000          | 1,360         | 450,300          | 843           | 774,000          | 1,360          | 450,300          | 843            |
| Perch, white.....                     | 300              | 15            | 200              | 10            | 300              | 15             | 200              | 10             |
| Scup.....                             | 1,100            | 55            | 1,500            | 70            | 1,100            | 55             | 1,500            | 70             |
| Spanish mackerel.....                 | 500              | 82            | 700              | 93            | 500              | 82             | 1,000            | 153            |
| Squeteague.....                       | 107,410          | 4,499         | 92,205           | 3,474         | 181,410          | 6,754          | 165,705          | 5,749          |
| Striped bass.....                     | 2,270            | 292           | 1,720            | 210           | 2,270            | 292            | 1,720            | 210            |
| Sturgeon.....                         |                  |               | 68,800           | 4,118         |                  |                | 68,800           | 4,118          |
| Tautog.....                           | 16               | 1             | 26               | 1             | 16               | 1              | 26               | 1              |
| Caviar.....                           |                  |               | 4,200            | 2,620         |                  |                | 4,200            | 2,620          |
| <b>Total.....</b>                     | <b>1,007,028</b> | <b>12,649</b> | <b>694,689</b>   | <b>15,531</b> | <b>1,240,928</b> | <b>23,197</b>  | <b>909,489</b>   | <b>25,206</b>  |
| <b>Shore fisheries:</b>               |                  |               |                  |               |                  |                |                  |                |
| Alewives.....                         |                  |               |                  |               | 206,040          | 2,210          | 253,880          | 2,760          |
| Blue-fish.....                        | 190,800          | 5,879         | 134,250          | 7,084         | 259,300          | 9,154          | 204,350          | 10,469         |
| Bonito.....                           | 350              | 14            | 200              | 8             | 350              | 14             | 200              | 8              |
| Butter-fish.....                      | 500              | 25            | 400              | 24            | 500              | 25             | 400              | 24             |
| Carp.....                             |                  |               |                  |               |                  |                | 300              | 14             |
| Cat-fish.....                         |                  |               |                  |               | 5,800            | 418            | 6,500            | 485            |
| Cod.....                              |                  |               |                  |               | 450              | 15             | 780              | 17             |
| Flounders.....                        | 6,900            | 226           | 5,400            | 216           | 7,000            | 234            | 5,600            | 231            |
| Mackerel.....                         | 57,200           | 1,666         | 9,100            | 1,413         | 57,400           | 1,690          | 9,450            | 1,455          |
| Menhaden.....                         | 1,632,000        | 2,740         | 1,401,000        | 2,560         | 1,632,000        | 2,740          | 1,401,000        | 2,560          |
| Perch.....                            |                  |               |                  |               | 8,600            | 518            | 10,800           | 696            |
| Pike.....                             |                  |               | 1,800            | 90            |                  |                | 1,800            | 90             |
| Scup.....                             | 6,000            | 363           | 2,800            | 160           | 6,000            | 363            | 2,800            | 160            |
| Sea bass.....                         | 1,900            | 153           | 1,250            | 100           | 1,900            | 153            | 1,250            | 100            |
| Shad.....                             |                  |               |                  |               | 1,553,547        | 51,269         | 1,509,737        | 52,736         |
| Spanish mackerel.....                 | 1,150            | 244           | 1,050            | 200           | 1,450            | 324            | 1,250            | 240            |
| Squeteague.....                       | 157,300          | 5,671         | 143,550          | 5,206         | 202,300          | 7,066          | 185,550          | 6,476          |
| Striped bass.....                     | 2,600            | 314           | 3,000            | 326           | 24,020           | 2,834          | 8,550            | 982            |
| Sturgeon.....                         | 340,860          | 21,511        | 285,169          | 27,754        | 424,467          | 26,118         | 319,955          | 30,358         |
| Suckers.....                          |                  |               |                  |               | 1,300            | 52             | 2,700            | 168            |
| Caviar.....                           |                  |               | 13,056           | 9,372         |                  |                | 13,056           | 9,372          |
| <b>Total.....</b>                     | <b>2,397,560</b> | <b>38,806</b> | <b>2,002,025</b> | <b>54,513</b> | <b>4,392,424</b> | <b>105,197</b> | <b>3,939,908</b> | <b>119,401</b> |
| <b>Total of vessel and shore.....</b> | <b>3,404,588</b> | <b>51,455</b> | <b>2,696,714</b> | <b>70,044</b> | <b>5,633,352</b> | <b>128,394</b> | <b>4,849,397</b> | <b>144,607</b> |

Table showing, by counties, the yield of the pound-net fisheries of New York in 1897 and 1898.

| Species.          | Kings. |      |         |       | Queens. |       |       |       | Richmond. |       |       |       |
|-------------------|--------|------|---------|-------|---------|-------|-------|-------|-----------|-------|-------|-------|
|                   | 1897.  |      | 1898.   |       | 1897.   |       | 1898. |       | 1897.     |       | 1898. |       |
|                   | Lbs.   | Val. | Lbs.    | Val.  | Lbs.    | Val.  | Lbs.  | Val.  | Lbs.      | Val.  | Lbs.  | Val.  |
| Shore fisheries:  |        |      |         |       |         |       |       |       |           |       |       |       |
| Alewives.....     | 2,000  | \$20 | 1,200   | \$15  | 3,944   | \$86  |       |       |           |       |       |       |
| Butter-fish.....  |        |      |         |       | 800     | 64    |       |       |           |       |       |       |
| Flounders.....    | 3,000  | 90   | 9,530   | 305   |         |       |       |       |           |       |       |       |
| Menhaden.....     | 6,752  | 43   | 14,700  | 98    |         |       |       |       |           |       |       |       |
| Shad.....         | 16,325 | 496  | 10,526  | 337   | 7,635   | 742   | 2,100 | \$140 | 5,925     | \$221 | 5,400 | \$245 |
| Squeteague.....   | 8,600  | 184  | 72,150  | 760   | 2,200   | 138   |       |       |           |       |       |       |
| Striped bass..... | 800    | 76   | 600     | 58    | 1,200   | 144   |       |       |           |       |       |       |
| Sturgeon.....     |        |      |         |       |         |       |       |       | 800       | 22    | 640   | 21    |
| Tautog.....       |        |      |         |       |         |       | 30    | 2     |           |       |       |       |
| Total.....        | 37,477 | 909  | 108,706 | 1,573 | 15,779  | 1,174 | 2,130 | 142   | 6,725     | 243   | 6,040 | 266   |

| Species.              | Suffolk.  |         |           |         | Total.    |         |           |         |
|-----------------------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
|                       | 1897.     |         | 1898.     |         | 1897.     |         | 1898.     |         |
|                       | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.      | Value.  |
| Shore fisheries:      |           |         |           |         |           |         |           |         |
| Alewives.....         | 48,210    | \$960   | 26,230    | \$524   | 54,154    | \$1,066 | 27,430    | \$539   |
| Blue-fish.....        | 181,985   | 6,452   | 211,582   | 7,177   | 181,985   | 6,452   | 211,582   | 7,177   |
| Bonito.....           | 34,750    | 1,807   | 55,104    | 1,472   | 34,750    | 1,807   | 55,104    | 1,472   |
| Butter-fish.....      | 720,816   | 25,886  | 461,436   | 15,251  | 721,616   | 25,950  | 461,436   | 15,251  |
| Cod.....              | 36,145    | 1,084   | 70,057    | 1,137   | 36,145    | 1,084   | 70,057    | 1,137   |
| Flounders.....        | 627,272   | 18,961  | 430,306   | 13,062  | 630,272   | 19,051  | 439,836   | 13,367  |
| Hake.....             | 20,200    | 504     | 27,131    | 560     | 20,200    | 504     | 27,131    | 560     |
| King-fish.....        | 10,440    | 872     | 11,854    | 978     | 10,440    | 872     | 11,854    | 978     |
| Mackerel.....         | 70,182    | 4,285   | 64,708    | 3,901   | 70,182    | 4,285   | 64,708    | 3,901   |
| Menhaden.....         | 1,771,000 | 2,745   | 1,397,700 | 2,385   | 1,777,752 | 2,788   | 1,412,400 | 2,483   |
| Pollock.....          | 3,000     | 90      | 4,635     | 130     | 3,000     | 90      | 4,635     | 130     |
| Scup.....             | 676,290   | 14,553  | 536,532   | 11,348  | 676,290   | 14,553  | 536,532   | 11,348  |
| Sea bass.....         | 150,410   | 7,580   | 86,286    | 4,395   | 150,410   | 7,580   | 86,286    | 4,395   |
| Shad.....             | 20,040    | 864     | 5,223     | 233     | 49,925    | 2,323   | 23,249    | 955     |
| Skates.....           | 150,000   | 100     | 127,500   | 85      | 150,000   | 100     | 127,500   | 85      |
| Spanish mackerel..... | 7,860     | 1,136   | 8,977     | 1,342   | 7,860     | 1,136   | 8,977     | 1,342   |
| Squeteague.....       | 1,837,900 | 45,039  | 1,414,395 | 32,975  | 1,848,700 | 45,361  | 1,486,545 | 33,735  |
| Squid.....            | 151,000   | 3,393   | 276,257   | 6,188   | 151,000   | 3,393   | 276,257   | 6,188   |
| Striped bass.....     | 12,977    | 1,334   | 13,685    | 1,402   | 14,977    | 1,554   | 14,285    | 1,460   |
| Sturgeon.....         |           |         |           |         | 800       | 22      | 640       | 21      |
| Tautog.....           | 26,285    | 829     | 26,654    | 852     | 26,285    | 829     | 26,684    | 854     |
| Whiting.....          | 9,000     | 250     | 15,473    | 449     | 9,000     | 250     | 15,473    | 449     |
| Other fish.....       | 975,000   | 1,300   | 831,000   | 1,112   | 975,000   | 1,300   | 831,000   | 1,112   |
| Total.....            | 7,540,762 | 140,024 | 6,102,725 | 106,958 | 7,600,743 | 142,350 | 6,219,601 | 108,939 |

Table showing, by counties, the yield of the fyke-net fisheries of New York in 1897 and 1898.

| Species.                  | Greene. |      |       |      | Kings. |       |        |       | Orange. |      |       |      |
|---------------------------|---------|------|-------|------|--------|-------|--------|-------|---------|------|-------|------|
|                           | 1897.   |      | 1898. |      | 1897.  |       | 1898.  |       | 1897.   |      | 1898. |      |
|                           | Lbs.    | Val. | Lbs.  | Val. | Lbs.   | Val.  | Lbs.   | Val.  | Lbs.    | Val. | Lbs.  | Val. |
| Shore fisheries:          |         |      |       |      |        |       |        |       |         |      |       |      |
| Alewives.....             |         |      |       |      |        |       | 18,000 | \$540 |         |      |       |      |
| Carp.....                 | 50      | \$2  | 100   | \$5  |        |       |        |       | 200     | \$8  | 300   | \$12 |
| Cat-fish.....             | 2,000   | 130  | 1,800 | 122  |        |       |        |       | 3,000   | 216  | 2,600 | 182  |
| Eels.....                 |         |      |       |      | 3,000  | \$270 | 2,200  | 198   | 250     | 15   | 200   | 12   |
| Flounders.....            |         |      |       |      | 1,400  | 52    | 1,600  | 59    |         |      |       |      |
| Perch, white.....         | 800     | 56   | 600   | 42   |        |       |        |       | 800     | 48   | 700   | 42   |
| Shad.....                 |         |      |       |      | 15,476 | 490   | 15,862 | 512   |         |      |       |      |
| Squeteague.....           |         |      |       |      | 1,200  | 36    | 1,000  | 20    |         |      |       |      |
| Striped bass.....         | 100     | 12   | 200   | 24   | 1,000  | 120   | 1,100  | 132   | 750     | 90   | 1,000 | 125  |
| Suckers.....              | 600     | 30   | 500   | 25   |        |       |        |       | 500     | 22   | 500   | 22   |
| Tomcod or frost-fish..... |         |      |       |      |        |       |        |       |         |      |       |      |
| Crabs, soft.....          |         |      |       |      | 200    | 10    |        |       |         |      |       |      |
|                           |         |      |       |      | 680    | 102   | 480    | 114   |         |      |       |      |
| Total.....                | 3,550   | 230  | 3,200 | 218  | 22,956 | 1,080 | 40,242 | 1,575 | 5,500   | 399  | 5,300 | 395  |

Table showing the yield of the fyke-net fisheries of New York in 1897 and 1898—Continued.

| Species.                   | Albany.   |        |         |        | Columbia.    |        |         |        | Dutchess. |        |        |        |
|----------------------------|-----------|--------|---------|--------|--------------|--------|---------|--------|-----------|--------|--------|--------|
|                            | 1897.     |        | 1898.   |        | 1897.        |        | 1898.   |        | 1897.     |        | 1898.  |        |
|                            | Lbs.      | Val.   | Lbs.    | Val.   | Lbs.         | Val.   | Lbs.    | Val.   | Lbs.      | Val.   | Lbs.   | Val.   |
| Shore fisheries:           |           |        |         |        |              |        |         |        |           |        |        |        |
| Carp .....                 | 400       | \$20   | 420     | \$21   |              |        |         |        | 1,100     | \$44   | 1,350  | \$54   |
| Cat-fish .....             | 2,500     | 200    | 2,200   | 176    | 5,400        | \$412  | 5,800   | \$464  | 5,000     | 380    | 5,200  | 379    |
| Eels .....                 |           |        | 50      | 4      |              |        |         |        |           |        |        |        |
| Perch, white .....         | 800       | 48     | 700     | 56     |              |        |         |        | 2,400     | 84     | 2,350  | 94     |
| Perch, yellow .....        |           |        |         |        | 3,000        | 115    | 3,000   | 115    |           |        |        |        |
| Striped bass .....         | 600       | 82     | 800     | 98     | 200          | 30     | 260     | 32     | 100       | 12     | 180    | 24     |
| Suckers .....              | 1,000     | 50     | 850     | 43     | 3,950        | 118    | 4,250   | 128    | 300       | 10     | 300    | 11     |
| Total .....                | 5,300     | 400    | 5,020   | 398    | 12,550       | 675    | 13,310  | 739    | 8,900     | 530    | 9,380  | 562    |
| Species.                   | Queens.   |        |         |        | Rensselaer.  |        |         |        | Richmond. |        |        |        |
|                            | 1897.     |        | 1898.   |        | 1897.        |        | 1898.   |        | 1897.     |        | 1898.  |        |
|                            | Lbs.      | Val.   | Lbs.    | Val.   | Lbs.         | Val.   | Lbs.    | Val.   | Lbs.      | Val.   | Lbs.   | Val.   |
| Shore fisheries:           |           |        |         |        |              |        |         |        |           |        |        |        |
| Alewives .....             |           |        |         |        |              |        |         |        | 3,520     | \$44   |        |        |
| Carp .....                 |           |        |         |        | 50           | \$3    | 80      | \$5    |           |        |        |        |
| Cat-fish .....             |           |        |         |        | 1,800        | 126    | 1,500   | 105    | 400       | 31     |        |        |
| Eels .....                 | 1,280     | \$100  | 1,500   | \$120  |              |        |         |        | 380       | 21     |        |        |
| Perch, white .....         |           |        |         |        | 650          | 39     | 500     | 30     | 260       | 15     |        |        |
| Shad .....                 |           |        |         |        |              |        |         |        | 29,587    | 1,012  | 19,268 | \$844  |
| Striped bass .....         |           |        |         |        | 300          | 38     | 650     | 84     | 300       | 36     |        |        |
| Suckers .....              |           |        |         |        | 800          | 46     | 550     | 30     |           |        |        |        |
| Total .....                | 1,280     | 100    | 1,500   | 120    | 3,600        | 252    | 3,280   | 254    | 34,447    | 1,159  | 19,268 | 844    |
| Species.                   | Rockland. |        |         |        | Westchester. |        |         |        | Ulster.   |        |        |        |
|                            | 1897.     |        | 1898.   |        | 1897.        |        | 1898.   |        | 1897.     |        | 1898.  |        |
|                            | Lbs.      | Val.   | Lbs.    | Val.   | Lbs.         | Val.   | Lbs.    | Val.   | Lbs.      | Val.   | Lbs.   | Val.   |
| Shore fisheries:           |           |        |         |        |              |        |         |        |           |        |        |        |
| Carp .....                 | 150       | \$6    | 220     | \$9    | 200          | \$8    | 300     | \$12   | 1,150     | \$56   | 1,800  | \$70   |
| Cat-fish .....             | 2,200     | 132    | 2,000   | 120    | 6,050        | 508    | 7,160   | 590    | 8,500     | 590    | 12,200 | 976    |
| Eels .....                 | 600       | 42     | 500     | 35     | 1,500        | 90     | 2,100   | 130    |           |        | 400    | 40     |
| Perch, white .....         | 800       | 48     | 700     | 42     | 900          | 45     | 800     | 40     | 4,000     | 200    | 4,900  | 260    |
| Striped bass .....         | 600       | 72     | 1,000   | 120    | 5,870        | 704    | 4,300   | 517    | 300       | 45     | 300    | 45     |
| Sturgeon .....             | 400       | 22     | 300     | 17     | 300          | 13     | 100     | 4      |           |        |        |        |
| Suckers .....              | 300       | 15     | 320     | 15     | 800          | 32     | 600     | 24     | 3,000     | 120    | 3,300  | 142    |
| Sun-fish .....             |           |        |         |        |              |        |         |        |           |        | 2,000  | 100    |
| Lobsters .....             |           |        |         |        | 3,000        | 420    | 2,730   | 410    |           |        |        |        |
| Total .....                | 5,050     | 337    | 5,040   | 358    | 18,620       | 1,820  | 18,090  | 1,727  | 16,950    | 1,011  | 24,900 | 1,633  |
| Species.                   | Suffolk.  |        |         |        | Total.       |        |         |        |           |        |        |        |
|                            | 1897.     |        | 1898.   |        | 1897.        |        | 1898.   |        | 1897.     |        | 1898.  |        |
|                            | Lbs.      | Value. | Lbs.    | Value. | Lbs.         | Value. | Lbs.    | Value. | Lbs.      | Value. | Lbs.   | Value. |
| Shore fisheries:           |           |        |         |        |              |        |         |        |           |        |        |        |
| Alewives .....             |           |        |         |        |              |        |         |        | 3,520     | \$44   | 18,000 | \$540  |
| Blue-fish .....            | 5,000     | \$250  | 5,100   | \$238  | 5,000        | 250    | 5,100   | 238    |           |        | 5,100  | 238    |
| Butter-fish .....          | 6,500     | 150    | 9,000   | 213    | 6,500        | 150    | 9,000   | 213    |           |        | 9,000  | 213    |
| Carp .....                 | 4,500     | 180    | 3,250   | 130    | 7,800        | 327    | 7,800   | 318    |           |        | 7,820  | 318    |
| Cat-fish .....             | 32,800    | 1,709  | 39,050  | 1,557  | 69,650       | 4,434  | 79,510  | 4,671  |           |        |        |        |
| Eels .....                 | 5,000     | 278    | 3,700   | 230    | 12,010       | 816    | 10,650  | 769    |           |        |        |        |
| Flounders .....            | 333,680   | 10,466 | 314,400 | 10,170 | 335,080      | 10,518 | 316,000 | 10,229 |           |        |        |        |
| Menhaden .....             | 21,000    | 40     | 24,000  | 44     | 21,000       | 40     | 24,000  | 44     |           |        |        |        |
| Perch, white .....         | 18,000    | 900    | 9,900   | 495    | 29,410       | 1,483  | 21,150  | 1,101  |           |        |        |        |
| Perch, yellow .....        |           |        |         |        | 3,000        | 115    | 3,000   | 115    |           |        |        |        |
| Scup .....                 | 7,000     | 185    | 10,000  | 231    | 7,000        | 185    | 10,000  | 231    |           |        |        |        |
| Sea bass .....             | 600       | 30     | 200     | 10     | 600          | 30     | 200     | 10     |           |        |        |        |
| Shad .....                 |           |        |         |        | 45,063       | 1,502  | 35,130  | 1,356  |           |        |        |        |
| Squeteague .....           | 4,800     | 192    | 11,000  | 380    | 6,000        | 228    | 12,000  | 400    |           |        |        |        |
| Striped bass .....         | 3,450     | 420    | 2,150   | 285    | 13,570       | 1,661  | 11,940  | 1,486  |           |        |        |        |
| Sturgeon .....             |           |        |         |        | 700          | 35     | 400     | 21     |           |        |        |        |
| Suckers .....              |           |        |         |        | 11,250       | 443    | 11,170  | 440    |           |        |        |        |
| Sun-fish .....             |           |        |         |        |              |        | 2,000   | 100    |           |        |        |        |
| Tautog .....               | 22,500    | 685    | 24,100  | 729    | 22,500       | 685    | 24,100  | 729    |           |        |        |        |
| Tomcod or frost-fish ..... | 40,600    | 894    | 34,500  | 691    | 40,800       | 904    | 34,500  | 691    |           |        |        |        |
| Crabs, soft .....          |           |        |         |        | 680          | 102    | 480     | 114    |           |        |        |        |
| Lobsters .....             |           |        |         |        | 3,000        | 420    | 2,730   | 410    |           |        |        |        |
| Total .....                | 505,430   | 16,379 | 490,350 | 15,403 | 644,133      | 24,372 | 638,880 | 24,226 |           |        |        |        |



## 218 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the catch of soft crabs by dip nets and hands in New York in 1897 and 1898.

| Counties.        | 1897.  |         | 1898.  |         |
|------------------|--------|---------|--------|---------|
|                  | Lbs.   | Value.  | Lbs.   | Value.  |
| Shore fisheries: |        |         |        |         |
| Queens.....      | 88,000 | \$1,770 | 86,280 | \$1,650 |
| Suffolk.....     | 10,167 | 1,330   | 10,063 | 1,390   |
| Total.....       | 98,167 | 3,100   | 96,343 | 3,040   |

The crabs in Queens County were caught without apparatus.

Table showing, by counties, the quantity and value of lobsters taken in pots in New York in 1897 and 1898.

| Counties.         | 1897.   |          | 1898.   |          |
|-------------------|---------|----------|---------|----------|
|                   | Lbs.    | Value.   | Lbs.    | Value.   |
| Vessel fisheries: |         |          |         |          |
| New York.....     | 230,420 | \$16,445 | 188,410 | \$15,073 |
| Suffolk.....      | 54,190  | 4,962    | 44,150  | 4,242    |
| Total.....        | 284,610 | 21,407   | 232,560 | 19,315   |
| Shore fisheries:  |         |          |         |          |
| Kings.....        | 12,860  | 1,193    | 26,240  | 2,362    |
| Richmond.....     | 43,200  | 4,268    | 39,968  | 4,053    |
| Suffolk.....      | 18,250  | 1,552    | 14,330  | 1,441    |
| Westchester.....  | 19,100  | 2,618    | 16,550  | 2,654    |
| Total.....        | 93,410  | 9,631    | 97,088  | 10,510   |
| Vessel and shore: |         |          |         |          |
| Kings.....        | 12,860  | 1,193    | 26,240  | 2,362    |
| New York.....     | 230,420 | 16,445   | 188,410 | 15,073   |
| Richmond.....     | 43,200  | 4,268    | 39,968  | 4,053    |
| Suffolk.....      | 72,440  | 6,514    | 58,480  | 5,683    |
| Westchester.....  | 19,100  | 2,618    | 16,550  | 2,654    |
| Grand total.....  | 378,020 | 31,038   | 329,648 | 29,825   |

Table showing, by counties, the yield of the line fisheries of New York in 1897 and 1898.

| Species.                | Queens. |         |         |         | Richmond. |         |        |        |
|-------------------------|---------|---------|---------|---------|-----------|---------|--------|--------|
|                         | 1897.   |         | 1898.   |         | 1897.     |         | 1898.  |        |
|                         | Lbs.    | Value.  | Lbs.    | Value.  | Lbs.      | Value.  | Lbs.   | Value. |
| Vessel fisheries:       |         |         |         |         |           |         |        |        |
| Blue-fish.....          | 42,500  | \$2,125 | 44,000  | \$2,200 |           |         |        |        |
| Cod.....                | 97,500  | 3,730   | 92,000  | 3,550   |           |         |        |        |
| Haddock.....            | 11,000  | 350     | 11,500  | 390     |           |         |        |        |
| Spanish mackerel.....   | 150     | 30      | 200     | 40      |           |         |        |        |
| Squeteague.....         | 4,500   | 130     | 3,000   | 100     |           |         |        |        |
| Total.....              | 155,650 | 6,365   | 150,700 | 6,280   |           |         |        |        |
| Shore fisheries:        |         |         |         |         |           |         |        |        |
| Blue-fish.....          | 24,000  | 1,200   | 12,500  | 625     |           |         |        |        |
| Cod.....                | 46,000  | 1,760   | 38,000  | 1,400   | 111,000   | \$3,370 | 19,650 | \$834  |
| Haddock.....            | 800     | 32      | 1,000   | 35      |           |         |        |        |
| Spanish mackerel.....   | 50      | 10      | 30      | 6       |           |         |        |        |
| Squeteague.....         | 1,600   | 54      | 1,350   | 44      |           |         |        |        |
| Total.....              | 72,450  | 3,056   | 52,880  | 2,110   | 111,000   | 3,370   | 19,650 | 834    |
| Total vessel and shore. | 228,100 | 9,421   | 203,580 | 8,390   | 111,000   | 3,370   | 19,650 | 834    |

Table showing the yield of the line fisheries of New York in 1897 and 1898—Continued.

| Species.                            | Kings.         |               |                |               | New York.         |                |                   |                |
|-------------------------------------|----------------|---------------|----------------|---------------|-------------------|----------------|-------------------|----------------|
|                                     | 1897.          |               | 1898.          |               | 1897.             |                | 1898.             |                |
|                                     | Lbs.           | Value.        | Lbs.           | Value.        | Lbs.              | Value.         | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>            |                |               |                |               |                   |                |                   |                |
| Blue-fish .....                     | 87,300         | \$4,406       | 93,770         | \$4,715       | 9,899,465         | \$336,059      | 10,222,689        | \$340,051      |
| Bonito .....                        |                |               |                |               | 4,703             | 139            | 5,856             | 159            |
| Cod .....                           | 120,740        | 3,285         | 111,500        | 3,018         | 1,182,410         | 38,300         | 1,265,150         | 42,712         |
| Flounders .....                     | 150            | 11            | 280            | 19            | 1,045             | 41             | 1,179             | 41             |
| Haddock .....                       | 3,650          | 103           | 3,400          | 94            | 78,870            | 2,637          | 75,383            | 2,548          |
| Hake .....                          | 400            | 15            | 300            | 9             | 1,000             | 20             | 1,190             | 28             |
| Mackerel .....                      | 1,080          | 83            | 1,200          | 96            |                   |                |                   |                |
| Scup .....                          |                |               |                |               | 3,200             | 96             | 48,795            | 822            |
| Sea bass .....                      | 1,250          | 88            | 1,325          | 92            | 117,095           | 4,844          | 156,116           | 6,352          |
| Sheepshead .....                    | 300            | 18            |                |               |                   |                |                   |                |
| Snappers, red .....                 |                |               |                |               | 92,000            | 3,680          | 76,000            | 3,040          |
| Squeteague .....                    | 6,500          | 312           | 6,750          | 324           | 1,100             | 13             | 2,241             | 12             |
| Striped bass .....                  | 150            | 16            | 250            | 25            |                   |                |                   |                |
| Tautog .....                        | 80             | 4             | 100            | 5             |                   |                |                   |                |
| Other fish .....                    |                |               |                |               |                   |                | 98                | 4              |
| <b>Total .....</b>                  | <b>221,600</b> | <b>8,341</b>  | <b>218,875</b> | <b>8,397</b>  | <b>11,380,888</b> | <b>385,829</b> | <b>11,854,697</b> | <b>395,769</b> |
| <b>Shore fisheries:</b>             |                |               |                |               |                   |                |                   |                |
| Blue-fish .....                     | 58,560         | 2,930         | 79,680         | 3,984         |                   |                |                   |                |
| Cod .....                           | 71,000         | 2,135         | 85,250         | 2,520         |                   |                |                   |                |
| Flounders .....                     | 3,700          | 170           | 3,400          | 148           |                   |                |                   |                |
| Haddock .....                       | 3,000          | 75            | 4,000          | 100           |                   |                |                   |                |
| Sea bass .....                      | 300            | 18            | 200            | 12            |                   |                |                   |                |
| Squeteague .....                    | 5,000          | 240           | 6,400          | 310           |                   |                |                   |                |
| Striped bass .....                  | 750            | 72            | 860            | 82            |                   |                |                   |                |
| Tautog .....                        | 300            | 15            | 350            | 18            |                   |                |                   |                |
| Tomcod or frost-fish .....          | 200            | 8             | 200            | 8             |                   |                |                   |                |
| <b>Total .....</b>                  | <b>142,810</b> | <b>5,663</b>  | <b>180,340</b> | <b>7,182</b>  |                   |                |                   |                |
| <b>Total vessel and shore .....</b> | <b>364,410</b> | <b>14,004</b> | <b>399,215</b> | <b>15,579</b> | <b>11,380,888</b> | <b>385,829</b> | <b>11,854,697</b> | <b>395,769</b> |

| Species.                            | Suffolk.       |               |                |               | Total.            |                |                   |                |
|-------------------------------------|----------------|---------------|----------------|---------------|-------------------|----------------|-------------------|----------------|
|                                     | 1897.          |               | 1898.          |               | 1897.             |                | 1898.             |                |
|                                     | Lbs.           | Value.        | Lbs.           | Value.        | Lbs.              | Value.         | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>            |                |               |                |               |                   |                |                   |                |
| Blue-fish .....                     | 110,612        | \$4,272       | 10,408         | \$535         | 10,139,877        | \$346,862      | 10,370,867        | \$347,501      |
| Bonito .....                        | 1,000          | 34            | 1,200          | 39            | 5,703             | 173            | 7,056             | 198            |
| Cod .....                           | 121,271        | 4,514         |                |               | 1,521,921         | 49,829         | 1,468,650         | 49,280         |
| Flounders .....                     | 13,240         | 418           | 1,578          | 58            | 14,435            | 470            | 3,037             | 118            |
| Haddock .....                       | 6,000          | 210           |                |               | 99,520            | 3,300          | 90,283            | 3,032          |
| Hake .....                          | 150            | 5             |                |               | 1,550             | 40             | 1,490             | 37             |
| Mackerel .....                      |                |               |                |               | 1,080             | 83             | 1,200             | 96             |
| Scup .....                          | 33             | 1             | 510            | 11            | 3,233             | 97             | 49,305            | 833            |
| Sea bass .....                      | 23,886         | 854           | 9,308          | 524           | 142,231           | 5,786          | 166,749           | 6,968          |
| Sheepshead .....                    |                |               |                |               | 300               | 18             |                   |                |
| Snappers, red .....                 |                |               |                |               | 92,000            | 3,680          | 76,000            | 3,040          |
| Spanish mackerel .....              | 450            | 73            | 420            | 72            | 600               | 103            | 620               | 112            |
| Squeteague .....                    | 9,617          | 289           | 5,889          | 194           | 21,717            | 744            | 17,880            | 630            |
| Striped bass .....                  | 98             | 11            |                |               | 248               | 27             | 250               | 25             |
| Tautog .....                        |                |               |                |               | 80                | 4              | 100               | 5              |
| Other fish .....                    |                |               |                |               |                   |                | 98                | 4              |
| <b>Total .....</b>                  | <b>286,357</b> | <b>10,681</b> | <b>29,313</b>  | <b>1,433</b>  | <b>12,044,495</b> | <b>411,216</b> | <b>12,253,585</b> | <b>411,879</b> |
| <b>Shore fisheries:</b>             |                |               |                |               |                   |                |                   |                |
| Blue-fish .....                     | 15,500         | 775           | 21,000         | 1,050         | 98,060            | 4,905          | 113,180           | 5,659          |
| Bonito .....                        | 700            | 31            | 800            | 35            | 700               | 31             | 800               | 35             |
| Cod .....                           | 323,500        | 11,440        | 353,950        | 13,691        | 551,500           | 18,705         | 496,850           | 18,445         |
| Flounders .....                     | 3,000          | 150           | 3,200          | 160           | 6,700             | 320            | 6,600             | 308            |
| Haddock .....                       | 49,600         | 1,481         | 77,200         | 2,365         | 53,400            | 1,588          | 82,200            | 2,500          |
| Hake .....                          | 2,550          | 64            | 4,000          | 87            | 2,550             | 64             | 4,000             | 87             |
| Mackerel .....                      | 2,000          | 65            |                |               | 2,000             | 65             |                   |                |
| Sea bass .....                      | 10,000         | 684           | 11,000         | 740           | 10,300            | 702            | 11,200            | 752            |
| Spanish mackerel .....              | 500            | 80            | 550            | 95            | 550               | 90             | 580               | 101            |
| Squeteague .....                    | 3,000          | 92            | 3,700          | 108           | 9,600             | 386            | 11,450            | 462            |
| Striped bass .....                  |                |               |                |               | 750               | 72             | 860               | 82             |
| Tautog .....                        |                |               |                |               | 300               | 15             | 350               | 18             |
| Tomcod or frost-fish .....          |                |               |                |               | 200               | 8              | 200               | 8              |
| Crabs, hard .....                   | 140,000        | 1,038         | 102,500        | 675           | 140,000           | 1,038          | 102,500           | 675            |
| Crabs, soft .....                   | 5,000          | 300           | 4,000          | 240           | 5,000             | 300            | 4,000             | 240            |
| <b>Total .....</b>                  | <b>555,350</b> | <b>16,200</b> | <b>581,900</b> | <b>19,246</b> | <b>881,610</b>    | <b>28,289</b>  | <b>834,770</b>    | <b>29,372</b>  |
| <b>Total vessel and shore .....</b> | <b>841,707</b> | <b>26,881</b> | <b>611,213</b> | <b>20,679</b> | <b>12,926,105</b> | <b>439,505</b> | <b>13,088,355</b> | <b>441,251</b> |

## 220 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the yield of eel pots and spears in New York in 1897 and 1898.

| Counties.        | Vessel fisheries. |         | Shore fisheries. |        |            |        | Total.  |        |
|------------------|-------------------|---------|------------------|--------|------------|--------|---------|--------|
|                  | Eels.             |         | Eels.            |        | Flounders. |        |         |        |
|                  | Lbs.              | Value.  | Lbs.             | Value. | Lbs.       | Value. | Lbs.    | Value. |
| 1897.            |                   |         |                  |        |            |        |         |        |
| Albany.....      |                   |         | 400              | \$30   |            |        | 400     | \$30   |
| Dutchess.....    |                   |         | 600              | 48     |            |        | 600     | 48     |
| Kings.....       | 23,100            | \$2,060 | 75,420           | 6,537  | 1,160      | \$62   | 99,680  | 8,659  |
| Queens.....      |                   |         | 88,430           | 6,255  |            |        | 88,430  | 6,255  |
| Richmond.....    |                   |         | 2,000            | 160    |            |        | 2,000   | 160    |
| Rockland.....    |                   |         | 1,200            | 84     |            |        | 1,200   | 84     |
| Suffolk.....     | 29,500            | 1,605   | 164,780          | 9,906  |            |        | 194,280 | 11,511 |
| Westchester..... |                   |         | 15,800           | 1,264  |            |        | 15,800  | 1,264  |
| Total.....       | 52,600            | 3,665   | 348,630          | 24,284 | 1,160      | 62     | 402,390 | 28,011 |
| 1898.            |                   |         |                  |        |            |        |         |        |
| Albany.....      |                   |         | 425              | 32     |            |        | 425     | 32     |
| Dutchess.....    |                   |         | 610              | 48     |            |        | 610     | 48     |
| Kings.....       | 23,200            | 2,060   | 71,250           | 6,104  | 1,160      | 62     | 95,610  | 8,226  |
| Queens.....      |                   |         | 74,560           | 5,220  |            |        | 74,560  | 5,220  |
| Richmond.....    |                   |         | 2,100            | 168    |            |        | 2,100   | 168    |
| Rockland.....    |                   |         | 1,100            | 77     |            |        | 1,100   | 77     |
| Suffolk.....     | 31,320            | 1,704   | 155,370          | 9,389  |            |        | 186,690 | 11,093 |
| Westchester..... |                   |         | 14,750           | 1,180  |            |        | 14,750  | 1,180  |
| Total.....       | 54,520            | 3,764   | 320,165          | 22,218 | 1,160      | 62     | 375,845 | 26,044 |

Table showing, by counties, the catch by dredges, tongs, rakes, etc., in New York in 1897 and 1898.

| Species.                    | Queens.   |         |           |         | Richmond. |         |           |         |
|-----------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|---------|
|                             | 1897.     |         | 1898.     |         | 1897.     |         | 1898.     |         |
|                             | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.      | Value.  |
| Vessel fisheries:           |           |         |           |         |           |         |           |         |
| Clams, hard.....            | 6,720     | \$990   | 2,800     | \$440   | 42,080    | \$4,785 | 27,360    | \$3,034 |
| Oysters, market....         | 464,100   | 68,060  | 601,818   | 94,870  | 1,593,060 | 216,173 | 1,258,705 | 176,980 |
| Oysters, seed.....          | 83,160    | 6,763   | 98,420    | 8,747   |           |         |           |         |
| Total.....                  | 553,980   | 75,813  | 703,038   | 104,057 | 1,635,140 | 220,958 | 1,286,065 | 180,014 |
| Shore fisheries:            |           |         |           |         |           |         |           |         |
| Crabs, hard.....            | 26,667    | 240     | 21,333    | 180     |           |         |           |         |
| Clams, hard.....            | 428,800   | 64,000  | 432,032   | 65,227  | 66,840    | 7,840   | 60,520    | 7,199   |
| Clams, soft.....            | 231,000   | 15,655  | 231,300   | 15,747  |           |         |           |         |
| Oysters, market....         | 3,089,450 | 485,415 | 2,370,004 | 385,641 | 997,220   | 136,872 | 1,079,190 | 149,827 |
| Oysters, seed.....          | 91,000    | 4,575   | 39,200    | 1,890   | 238,350   | 13,615  | 567,350   | 32,620  |
| Scallops.....               | 9,000     | 750     | 12,000    | 1,000   | 20,400    | 2,210   | 22,800    | 2,470   |
| Total.....                  | 3,875,917 | 570,635 | 3,105,869 | 469,685 | 1,322,810 | 160,537 | 1,729,860 | 192,116 |
| Total vessel and shore..... | 4,429,897 | 646,448 | 3,808,907 | 573,742 | 2,957,950 | 381,495 | 3,015,925 | 372,130 |

| Species.            | Kings.    |          |           |          | New York. |          |         |          |
|---------------------|-----------|----------|-----------|----------|-----------|----------|---------|----------|
|                     | 1897.     |          | 1898.     |          | 1897.     |          | 1898.   |          |
|                     | Lbs.      | Value.   | Lbs.      | Value.   | Lbs.      | Value.   | Lbs.    | Value.   |
| Vessel fisheries:   |           |          |           |          |           |          |         |          |
| Oysters, market.... |           |          |           |          | 528,500   | \$61,080 | 486,150 | \$54,162 |
| Shore fisheries:    |           |          |           |          |           |          |         |          |
| Clams, hard.....    | 206,504   | \$24,980 | 214,240   | \$26,476 |           |          |         |          |
| Clams, soft.....    | 373,000   | 27,110   | 446,650   | 33,104   |           |          |         |          |
| Oysters, market.... | 2,201,500 | 322,755  | 1,937,670 | 282,210  |           |          |         |          |
| Mussels.....        | 30,000    | 960      |           |          |           |          |         |          |
| Total.....          | 2,811,004 | 375,805  | 2,598,560 | 341,790  | 528,500   | 61,080   | 486,150 | 54,162   |

Table showing, by counties, the catch by dredges, tongs, rakes, etc., in New York in 1897 and 1898—Continued.

| Species.                            | Suffolk.          |                |                   |                | Westchester.   |               |                |               |
|-------------------------------------|-------------------|----------------|-------------------|----------------|----------------|---------------|----------------|---------------|
|                                     | 1897.             |                | 1898.             |                | 1897.          |               | 1898.          |               |
|                                     | Lbs.              | Value.         | Lbs.              | Value.         | Lbs.           | Value.        | Lbs.           | Value.        |
| <b>Vessel fisheries:</b>            |                   |                |                   |                |                |               |                |               |
| Crabs, hard .....                   | 129,333           | \$1,070        | 122,800           | \$938          |                |               |                |               |
| Clams, hard .....                   | 219,040           | 30,265         | 257,440           | 35,726         |                |               |                |               |
| Oysters, market .....               | 3,065,300         | 432,401        | 3,681,650         | 518,350        | 88,550         | \$11,380      | 68,950         | \$7,685       |
| Oysters, seed .....                 | 556,500           | 52,460         | 636,405           | 62,205         | 16,800         | 1,180         | 11,200         | 680           |
| Scallops .....                      | 358,860           | 32,995         | 243,228           | 20,248         |                |               |                |               |
| Shells .....                        | 5,310,000         | 4,875          | 5,460,000         | 4,550          |                |               |                |               |
| <b>Total .....</b>                  | <b>9,639,033</b>  | <b>554,066</b> | <b>10,401,523</b> | <b>642,017</b> | <b>105,350</b> | <b>12,560</b> | <b>80,150</b>  | <b>8,365</b>  |
| <b>Shore fisheries:</b>             |                   |                |                   |                |                |               |                |               |
| Crabs, hard .....                   | 13,333            | 125            |                   |                |                |               |                |               |
| Clams, hard .....                   | 368,720           | 47,850         | 373,600           | 49,557         | 133,600        | 18,220        | 135,200        | 18,293        |
| Clams, soft .....                   | 106,000           | 7,348          | 105,350           | 7,384          | 37,000         | 4,840         | 34,500         | 4,562         |
| Oysters, market .....               | 1,360,450         | 201,534        | 1,227,975         | 179,908        | 171,500        | 19,325        | 111,125        | 13,974        |
| Oysters, seed .....                 | 341,600           | 16,470         | 259,700           | 15,280         |                |               |                |               |
| Scallops .....                      | 497,700           | 44,167         | 375,150           | 29,712         |                |               |                |               |
| <b>Total .....</b>                  | <b>2,687,803</b>  | <b>317,494</b> | <b>2,341,775</b>  | <b>281,841</b> | <b>342,100</b> | <b>42,385</b> | <b>280,825</b> | <b>36,829</b> |
| <b>Total vessel and shore .....</b> | <b>12,326,836</b> | <b>871,560</b> | <b>12,743,298</b> | <b>923,858</b> | <b>447,450</b> | <b>54,945</b> | <b>360,975</b> | <b>45,194</b> |

## SUMMARY.

| Species.                            | 1897.             |                  | 1898.             |                  |
|-------------------------------------|-------------------|------------------|-------------------|------------------|
|                                     | Lbs.              | Value.           | Lbs.              | Value.           |
| <b>Vessel fisheries:</b>            |                   |                  |                   |                  |
| Crabs, hard .....                   | 129,333           | \$1,070          | 122,800           | \$938            |
| Clams, hard .....                   | 267,840           | 36,040           | 287,600           | 39,200           |
| Oysters, market .....               | 5,739,510         | 789,094          | 6,097,273         | 852,047          |
| Oysters, seed .....                 | 656,460           | 60,403           | 746,025           | 71,632           |
| Scallops .....                      | 358,860           | 32,995           | 243,228           | 20,248           |
| Shells .....                        | 5,310,000         | 4,875            | 5,460,000         | 4,550            |
| <b>Total .....</b>                  | <b>12,462,003</b> | <b>924,477</b>   | <b>12,956,926</b> | <b>988,615</b>   |
| <b>Shore fisheries:</b>             |                   |                  |                   |                  |
| Crabs, hard .....                   | 40,000            | 365              | 21,333            | 180              |
| Clams, hard .....                   | 1,204,464         | 162,890          | 1,215,592         | 166,752          |
| Clams, soft .....                   | 747,000           | 54,953           | 817,800           | 60,797           |
| Oysters, market .....               | 7,820,120         | 1,165,901        | 6,725,964         | 1,011,560        |
| Oysters, seed .....                 | 670,950           | 34,660           | 866,250           | 49,790           |
| Mussels .....                       | 30,000            | 960              |                   |                  |
| Scallops .....                      | 527,100           | 47,127           | 409,950           | 33,182           |
| <b>Total .....</b>                  | <b>11,039,634</b> | <b>1,466,856</b> | <b>10,056,889</b> | <b>1,322,261</b> |
| <b>Total vessel and shore .....</b> | <b>23,501,637</b> | <b>2,391,333</b> | <b>23,013,815</b> | <b>2,310,876</b> |

## THE MENHADEN INDUSTRY.

In comparing the menhaden industry of New York in 1898 with that of previous years, a considerable difference is noticed, due to a consolidation of the principal menhaden plants on the coast. Several factories were closed and the facilities of those operated were greatly augmented. Most of the steamers on the North Atlantic were included in the consolidation, and as the home office of the association is in New York, all the vessels are reported from this State in 1898, though a very large portion of their catch was landed at factories in Delaware, Rhode Island, and Maine.

Table showing the extent of the menhaden industry of New York in 1897 and 1898.

| Items.   | 1897.       |           | 1898.      |           |
|--|-------------|-----------|------------|-----------|
|  | No.         | Value.    | No.        | Value.    |
| Factories.....                                   | 7           | \$248,500 | 3          | \$503,500 |
| Cash capital.....                                |             | 147,500   |            | 101,600   |
| Persons in factories.....                        | 291         |           | 191        |           |
| Persons on vessels.....                          | 326         |           | 822        |           |
| Menhaden pressed.....                            | 119,326,400 | 169,114   | 78,691,670 | 116,728   |
| Tons of dry scrap prepared.....                  | 6,042       | 117,401   | 3,409      | 65,233    |
| Tons of acidulated and crude scrap prepared..... | 4,209       | 40,926    | 1,925      | 18,976    |
| Gallons of oil made.....                         | 763,531     | 169,133   | 529,919    | 106,611   |
| Steam vessels fishing.....                       | 14          | 154,500   | *36        | 406,750   |
| Tonnage.....                                     | 1,222       |           | 2,864      |           |
| Outfit.....                                      |             | 37,840    |            | 100,740   |
| Purse seines.....                                | 28          | 13,900    | 72         | 35,800    |
| Sail vessels fishing.....                        | 1           | 900       |            |           |
| Tonnage.....                                     | 20          |           |            |           |
| Outfit.....                                      |             | 50        |            |           |
| Purse seines.....                                | 1           | 200       |            |           |

\*These steam vessels also supplied menhaden to factories in Delaware, Rhode Island, and Maine.

Table showing the extent of the wholesale trade in fishery products of New York City in 1898.

| Items.                         | Fresh fish and lobster trade. | Salt fish trade. | Oyster trade. | Total.      | Products.                    |             |
|--------------------------------|-------------------------------|------------------|---------------|-------------|------------------------------|-------------|
|                                |                               |                  |               |             | Items.                       | Value.      |
| Number of firms.....           | 41                            | 11               | 25            | 77          | Fresh fish and lobsters..... | \$7,523,006 |
| Number of persons engaged..... | 483                           | 243              | 693           | 1,419       | Salted fish.....             | 3,376,923   |
| Value of shore property..      | \$1,203,506                   | \$717,100        | \$128,050     | \$2,048,656 | Oysters.....                 | 2,047,563   |
| Amount of cash capital..       | \$1,439,200                   | \$651,000        | \$779,000     | \$2,869,200 | Clams.....                   | 603,924     |
| Amount paid for wages..        | \$338,899                     | \$140,900        | \$442,065     | \$921,864   |                              | 13,551,415  |

FISHERIES OF NEW JERSEY.

Though New Jersey is comparatively small in area, its great length of coast line and favorable geographical position make it well adapted for the prosecution of extensive commercial fisheries.

The lower part of the Hudson River forms the eastern boundary between New York and New Jersey for about 22 miles, affording the citizens of the latter State an opportunity for sharing in the shad fisheries of that river to the extent of nearly 50 per cent of the value of the catch. The quantity of shad taken on the Hudson in 1897 was approximately 2,701,649 pounds, valued at \$93,512. Of this quantity 1,195,600 pounds, valued at \$44,159, represents the part belonging to New Jersey. In 1898 the total catch on the river was 2,745,590 pounds, valued at \$92,228, of which 1,209,920 pounds, valued at \$41,353, were taken by the New Jersey fishermen.

The other waters valuable for their fisheries which skirt the east side of the State north of Sandy Hook are New York Bay, Staten Island Sound, and Raritan and Princess bays. These are especially productive of oysters and clams, the two last named having considerable areas suitable for oyster cultivation. Sandy Hook Bay and the Navesink and Shrewsbury rivers inside of Sandy Hook also add materially

to the resources of the clam and oyster fisheries. The coast from Sandy Hook to Cape May lying directly on the Atlantic Ocean has long been noted for its pound-net and hand-line fisheries. The shallow bays throughout the part of this region from Bay Head southward, inclosed from the ocean by a series of sandy islands or bars, are also very productive in oysters, clams, and various species of fish.

The west side of the State is also highly favored in point of fishery resources, its entire length being traversed by the Delaware River and Bay. The three most important fisheries prosecuted in these waters are the shad, sturgeon, and oyster. The total yield of the river and bay for these three fisheries in 1897, as near as can be approximated, was 14,727,296 pounds of shad, valued at \$378,476; 2,428,616 pounds of sturgeon (1,058,666 pounds after being dressed), having a value, including caviar, of \$124,440, and 2,475,860 bushels of oysters, valued at \$1,118,650; a total value of \$1,621,566. The part of this output taken by the fishermen of New Jersey was 11,554,307 pounds of shad, valued at \$285,125; 1,951,421 pounds of sturgeon, or 772,349 pounds after being dressed, valued, including the caviar, at \$89,430, and 2,046,156 bushels of oysters, valued at \$910,779; a total value of \$1,285,334, or 79 per cent of the total value of the products of these three fisheries, the remainder being credited to Pennsylvania and Delaware. In 1898 the quantity of shad taken from this river and bay by New Jersey fishermen was 11,433,634 pounds, valued at \$241,374; of sturgeon, 1,298,315 pounds, or about 513,847 pounds after being dressed, valued, including caviar, at \$96,236, and of oysters about 1,535,397 bushels, valued at \$947,638; a total value of \$1,285,248.

Statistics of Pennsylvania and Delaware not being obtained for 1898, the proportion of the three leading products of the Delaware River and Bay taken by New Jersey in that year can not be shown, but the foregoing are sufficient to illustrate how largely this State is interested in the fisheries of the two important rivers, the Delaware and the Hudson, which separate it from adjacent States.

#### GENERAL STATISTICS.

In all important respects the fisheries of New Jersey in 1897 and 1898 show an increase over former years, except that the products, while greater in quantity, were less in value than in 1892. There has been an increase over each of the years from 1889 to 1892 in the number of persons and vessels employed, the value of fishing apparatus, and, with the exception noted, in the quantity and value of the products.

In 1897 the number of persons engaged in the fisheries of the State was 12,494. Of these, 2,484 were employed on vessels fishing and transporting fishery products, 9,400 in the shore or boat fisheries, and 610 in factories and other branches of shore industry connected with the fisheries.



The number of vessels fishing and transporting was 675, having a value, with their outfits, of \$766,844; the number of boats in the shore fisheries was 6,365, valued at \$485,059; the apparatus, consisting of seines, gill nets, pound nets and weirs, fyke nets, stop nets, hand and trawl lines, lobster and eel pots, oyster tongs, rakes and dredges, clam tongs, rakes and hoes, and various small apparatus, was valued at \$381,958, \$46,759 of this value being used on vessels and \$335,199 on boats. The value of shore and accessory property was \$563,992, and the amount of cash capital utilized was \$173,400, a total investment, including the cash capital, of \$2,371,253.

In 1898 the number of persons engaged was slightly less than in the former year, being 12,270—2,213 on vessels, 9,413 on boats, and 644 in shore industries. The number of vessels employed was 648, being 27 less than in 1897, and valued, with their outfits, at \$746,575; the number of boats was 6,424, valued at \$483,889; the fishing apparatus used was valued at \$380,111; the shore and accessory property at \$561,048; the cash capital was \$165,800, and the total investment \$2,337,423, being \$33,830 less than in the preceding year.

The products of the fisheries in 1897 consisted of 72,429,539 pounds of fish, valued at \$1,189,935; 200,155 pounds of caviar, valued at \$67,592; 1,605,264 hard crabs in number, valued at \$14,411; 780,639 soft crabs, valued at \$25,658; 562,400 king crabs, valued at \$4,495; 99,230 pounds of lobsters, valued at \$8,573; 2,896 pounds of shrimp, valued at \$1,565; 3,005,048 bushels of oysters, valued at \$1,682,015; 591,272 bushels of hard clams, valued at \$543,795; 74,500 bushels of soft clams, valued at \$63,725; 12,000 bushels of scallops, valued at \$4,000; 50,400 bushels of mussels, valued at \$1,575; 13,528 pounds of terrapin, valued at \$6,096, and 14,550 pounds of turtles, valued at \$999; a total value of \$3,614,434.

The value of all species classed as fish, including caviar, a product of the sturgeon, was \$1,257,527; of the molluscan species, \$2,295,110, and of the crustacean and reptilian species, \$61,797. The species of fish taken in greatest quantity were alewives, 2,053,802 pounds, \$9,529; blue-fish, 5,164,173 pounds, \$148,257; cod, 3,481,890 pounds, \$71,208; flounders, 1,225,725 pounds, \$29,018; menhaden, 30,552,825 pounds, \$70,056; sea bass, 2,131,480 pounds, \$74,281; shad, 13,000,783 pounds, \$342,931, and squeteague, 8,679,132 pounds, \$180,989.

The molluscan fisheries surpass all others in value, the oysters alone having a greater value than all the species of fish combined. The most important crustaceans are the hard and soft crabs, although in weight the catch of king crabs exceeds all the other varieties. The yield of lobsters is not large, and shrimp are taken only in small quantities. The catch of shad in New Jersey is greater than in any other State, and comprises about one-fourth of the shad taken in the entire country.

In 1898 the value of all species classed as fish, including caviar, was \$1,239,519; of the molluscan species, \$2,264,833, and of the crustacean and reptilian species, \$59,414—a total value of \$3,563,766, being \$50,668 less than in the previous year. There was no marked decrease in any single fishery, but a slight falling off in a number of species contributed to this result.

The three tables which follow show in a condensed form the number of persons engaged, the number and value of vessels, boats, and of the various kinds of apparatus employed, the value of shore and accessory property, and the amount of cash capital in the fisheries of New Jersey in 1897 and 1898:

*Number of persons employed.*

| How engaged.                    | 1897.  | 1898.  |
|---------------------------------|--------|--------|
| On vessels fishing.....         | 2,169  | 1,926  |
| On vessels transporting.....    | 315    | 287    |
| In shore or boat fisheries..... | 9,400  | 9,413  |
| Shoresmen.....                  | 610    | 644    |
| Total.....                      | 12,494 | 12,270 |

*Table of apparatus and capital.*

| Items.                                | 1897. |           | 1898. |           |
|---------------------------------------|-------|-----------|-------|-----------|
|                                       | No.   | Value.    | No.   | Value.    |
| Vessels fishing.....                  | 542   | \$499,576 | 531   | \$465,875 |
| Tonnage.....                          | 6,185 |           | 5,564 |           |
| Outfit.....                           |       | 96,501    |       | 92,161    |
| Vessels transporting.....             | 133   | 149,875   | 117   | 168,775   |
| Tonnage.....                          | 2,267 |           | 2,019 |           |
| Outfit.....                           |       | 20,892    |       | 19,764    |
| Boats.....                            | 6,365 | 485,059   | 6,424 | 483,889   |
| Apparatus—vessel fisheries:           |       |           |       |           |
| Seines.....                           | 17    | 5,268     | 16    | 4,588     |
| Gill nets.....                        | 6     | 640       | 13    | 900       |
| Fyke nets.....                        | 150   | 1,314     | 170   | 1,526     |
| Stop nets.....                        | 2     | 400       | 2     | 400       |
| Lines.....                            |       | 984       |       | 1,096     |
| Pots.....                             | 175   | 143       | 315   | 253       |
| Oyster dredges and tongs.....         | 1,388 | 30,963    | 1,367 | 32,918    |
| Clam tongs and rakes.....             | 584   | 6,435     | 564   | 6,468     |
| Crab dredges.....                     | 144   | 612       | 182   | 736       |
| Apparatus—shore fisheries:            |       |           |       |           |
| Seines.....                           | 505   | 34,626    | 527   | 34,509    |
| Gill nets.....                        | 4,136 | 123,518   | 4,291 | 126,842   |
| Pound nets and weirs.....             | 180   | 98,995    | 172   | 88,885    |
| Fyke nets.....                        | 2,406 | 15,124    | 2,665 | 16,944    |
| Stop nets.....                        | 80    | 4,778     | 65    | 4,233     |
| Lines.....                            |       | 5,401     |       | 6,344     |
| Pots.....                             | 4,309 | 5,033     | 4,385 | 5,109     |
| Oyster tongs, rakes, and dredges..... | 4,823 | 26,722    | 4,908 | 27,094    |
| Clam tongs, rakes, and hoes.....      | 3,463 | 19,846    | 3,523 | 20,529    |
| Minor apparatus.....                  |       | 1,156     |       | 737       |
| Shore and accessory property.....     |       | 563,992   |       | 561,048   |
| Cash capital.....                     |       | 173,400   |       | 165,800   |
| Total.....                            |       | 2,371,253 |       | 2,337,423 |

Table of products.

| Species.                | 1897.       |           | 1898.       |           |
|-------------------------|-------------|-----------|-------------|-----------|
|                         | Lbs.        | Value.    | Lbs.        | Value.    |
| Albacore.....           | 14,120      | \$294     | 16,550      | \$333     |
| Alewives.....           | 2,053,802   | 9,529     | 1,609,947   | 8,707     |
| Blue-fish.....          | 5,164,173   | 148,257   | 5,077,085   | 163,620   |
| Bonito.....             | 358,700     | 9,605     | 376,822     | 9,943     |
| Butter-fish.....        | 217,057     | 5,867     | 262,627     | 8,080     |
| Carp.....               | 785,409     | 39,370    | 245,983     | 13,884    |
| Cat-fish.....           | 221,985     | 11,114    | 229,648     | 11,688    |
| Cod.....                | 3,481,890   | 71,208    | 2,582,990   | 82,374    |
| Croakers.....           | 280,800     | 5,021     | 412,320     | 7,375     |
| Drum.....               | 82,900      | 842       | 82,644      | 822       |
| Eels.....               | 749,405     | 35,862    | 799,488     | 38,309    |
| Flounders.....          | 1,225,725   | 29,018    | 1,333,735   | 32,659    |
| Haddock.....            | 167,375     | 3,060     | 240,050     | 7,806     |
| Hake.....               | 69,735      | 1,538     | 98,042      | 2,359     |
| Hickory shad.....       | 3,719       | 229       | 3,500       | 220       |
| King-fish.....          | 43,027      | 3,766     | 44,002      | 3,935     |
| Mackerel.....           | 24,300      | 1,628     | 16,480      | 1,322     |
| Menhaden.....           | 30,552,825  | 70,056    | 22,193,530  | 53,726    |
| Mullet, fresh.....      | 21,275      | 497       | 27,500      | 667       |
| Mullet, salted.....     | 800         | 40        | 500         | 25        |
| Perch, white.....       | 596,917     | 37,924    | 631,522     | 39,381    |
| Perch, yellow.....      | 5,960       | 297       | 4,810       | 239       |
| Pike and pickerel.....  | 2,770       | 152       | 2,560       | 150       |
| Salmon.....             | 2,202       | 731       | 1,116       | 389       |
| Scup.....               | 757,450     | 13,816    | 622,165     | 13,572    |
| Sea bass.....           | 2,131,480   | 74,281    | 2,189,533   | 79,889    |
| Shad.....               | 13,000,783  | 342,931   | 12,844,432  | 293,173   |
| Sheephead.....          | 49,835      | 8,565     | 42,735      | 7,273     |
| Skates.....             | 11,650      | 291       | 12,750      | 319       |
| Spanish mackerel.....   | 108,030     | 11,539    | 83,125      | 9,726     |
| Spots.....              | 20,700      | 682       | 22,350      | 788       |
| Squeteague, fresh.....  | 8,662,232   | 180,018   | 9,384,453   | 202,457   |
| Squeteague, salted..... | 16,900      | 971       | 16,750      | 962       |
| Striped bass.....       | 287,189     | 31,978    | 274,353     | 28,695    |
| Sturgeon.....           | 813,449     | 26,464    | 719,024     | 21,273    |
| Suckers.....            | 142,130     | 6,720     | 155,511     | 7,383     |
| Tautog.....             | 289,400     | 5,513     | 314,748     | 6,029     |
| Miscellaneous fish..... | 11,440      | 261       | 11,360      | 274       |
| Caviar.....             | 200,155     | 67,592    | 149,302     | 79,693    |
| Crabs, hard.....        | 1,535,088   | 14,411    | 2,614,785   | 15,826    |
| Crabs, soft.....        | 260,213     | 25,658    | 269,078     | 25,805    |
| King crabs.....         | 51,124,800  | 4,495     | 61,062,190  | 4,343     |
| Lobsters.....           | 99,230      | 8,573     | 123,876     | 11,097    |
| Shrimp.....             | 2,896       | 1,565     | 2,685       | 1,465     |
| Oysters, market.....    | 79,545,361  | 1,453,369 | 89,394,147  | 1,309,111 |
| Oysters, seed.....      | 11,489,980  | 228,646   | 107,970,592 | 359,913   |
| Clams, hard.....        | 114,730,177 | 543,795   | 124,495,073 | 524,339   |
| Clams, soft.....        | 13,745,000  | 63,725    | 14,795,000  | 66,345    |
| Scallops.....           | 15,72,000   | 4,000     | 16,56,800   | 3,100     |
| Mussels.....            | 172,520,000 | 1,575     | 182,365,000 | 1,725     |
| Terrapin.....           | 13,528      | 6,096     |             |           |
| Turtles.....            | 14,550      | 999       | 12,850      | 878       |
| Total.....              | 103,782,517 | 3,614,434 | 90,297,118  | 3,563,766 |

<sup>1</sup> 1,605,264 in number.<sup>2</sup> 1,844,355 in number.<sup>3</sup> 780,639 in number.<sup>4</sup> 807,234 in number.<sup>5</sup> 562,400 in number.<sup>6</sup> 531,095 in number.<sup>7</sup> 1,363,623 bushels.<sup>8</sup> 1,342,021 bushels.<sup>9</sup> 1,641,425 bushels.<sup>10</sup> 1,138,656 bushels.<sup>11</sup> 591,272 bushels.<sup>12</sup> 561,884 bushels.<sup>13</sup> 74,500 bushels.<sup>14</sup> 79,500 bushels.<sup>15</sup> 12,000 bushels.<sup>16</sup> 9,300 bushels.<sup>17</sup> 50,400 bushels.<sup>18</sup> 47,700 bushels.

Some of the products shown above in pounds are exhibited in the following supplementary table in number or bushels, the unit of measure by which they are usually sold:

| Products.            | 1897.     |           | 1898.     |           |
|----------------------|-----------|-----------|-----------|-----------|
|                      | No.       | Value.    | No.       | Value.    |
| Crabs, hard.....     | number..  |           |           |           |
| Crabs, soft.....     | do.....   |           |           |           |
| King crabs.....      | do.....   |           |           |           |
| Clams, hard.....     | bushels.. |           |           |           |
| Clams, soft.....     | do.....   |           |           |           |
| Oysters, market..... | do.....   |           |           |           |
| Oysters, seed.....   | do.....   |           |           |           |
| Mussels.....         | do.....   |           |           |           |
| Scallops.....        | do.....   |           |           |           |
| Crabs, hard.....     | 1,605,264 | \$14,411  | 1,844,355 | \$15,826  |
| Crabs, soft.....     | 780,639   | 25,658    | 807,234   | 25,805    |
| King crabs.....      | 562,400   | 4,495     | 531,095   | 4,343     |
| Clams, hard.....     | 591,272   | 543,795   | 561,884   | 524,339   |
| Clams, soft.....     | 74,500    | 63,725    | 79,500    | 66,345    |
| Oysters, market..... | 1,363,623 | 1,453,369 | 1,342,021 | 1,309,111 |
| Oysters, seed.....   | 1,641,425 | 228,646   | 1,138,656 | 359,913   |
| Mussels.....         | 50,400    | 1,575     | 47,700    | 1,725     |
| Scallops.....        | 12,000    | 4,000     | 9,300     | 3,100     |

## STATISTICS OF THE FISHERIES BY COUNTIES.

There are 21 counties in New Jersey, 18 of which are interested to a greater or less extent in the fishery industry. Essex County is interested only in respect to the fishery trade which is carried on at Newark, but the remaining 17 counties are directly engaged in fisheries. Seven of these counties, Bergen, Hudson, Union, Middlesex, Monmouth, Ocean, and Atlantic, and the east side of Burlington and Cape May, are on the eastern side of the State, prosecuting their fisheries mainly in the Atlantic Ocean and tributary bays and rivers, while the remaining counties, Sussex, Warren, Hunterdon, Mercer, Camden, Gloucester, Salem, Cumberland, and the west side of Burlington and Cape May, are on the Delaware River and Bay.

The county having the most extensive fisheries, as determined by the value of the products, is Monmouth. The number of persons engaged in the fisheries of this county in 1897 was 2,209. Of these, 403 were employed on vessels, 1,689 on boats, and 117 were shoresmen. The investment in vessels, boats, fishing apparatus, shore property, and cash capital amounted to \$545,445. The products, consisting of a large variety of species, were valued at \$977,683.

In 1898 the number of persons engaged in all branches of fisheries in the county was 2,279; the amount of capital invested was \$563,774, and the value of the products \$971,418. The species taken in greatest abundance in 1897 were blue-fish, 4,264,400 pounds, \$113,197; cod, 2,222,000 pounds, \$32,620; menhaden, 20,223,800 pounds, \$50,266; squeteague, 5,499,919 pounds, \$97,653; oysters, 188,487 bushels, \$186,090; hard clams, 267,861 bushels, \$290,654; and soft clams, 70,300 bushels, \$61,625. In 1898 blue-fish aggregated 4,163,070 pounds, \$125,548; cod, 1,200,200 pounds, \$34,920; menhaden, 16,413,500 pounds, \$43,078; squeteague, 6,279,603 pounds, \$118,845; oysters, 148,239 bushels, \$147,224; hard clams, 258,546 bushels, \$282,348; and soft clams, 75,500 bushels, \$64,345. In addition to these there were more than thirty other varieties, many of which are important food species and are taken in comparatively large quantities.

Cumberland County, which ranks next in the value of its fishery products, exceeded Monmouth in the number of persons employed and capital invested in 1897, but only in the investment in 1898. The number of persons engaged in the fisheries of this county in 1897 was 1,420 on vessels, 709 in shore or boat fisheries, and 263 on shore; a total of 2,392. The amount of capital invested was \$678,788, and the products, consisting largely of oysters, were valued at \$859,950.

In 1898 the fisheries of this county employed 2,111 persons, the amount of capital invested was \$645,680, and the value of the products was \$867,549. The excess of capital in this county as compared with Monmouth is due to the employment of a much larger number of vessels.

The principal species taken in this county in 1897 were shad, 593,230 pounds, \$17,509; sturgeon, including caviar, 307,685 pounds, \$27,493; and oysters, 1,847,458 bushels, \$801,386. In 1898 the yield of shad was 668,300 pounds, \$17,150; of sturgeon and caviar, 362,806 pounds, \$31,605; and of oysters, 1,316,738 bushels, \$806,177.

Other counties having important fisheries are Atlantic, Ocean, Cape May and Salem. The fisheries of Atlantic County in 1897 employed 1,143 persons; the amount of capital invested was \$156,965, and the value of the products was \$447,942. In 1898 there were 1,170 persons employed, \$160,843 invested, and the products were valued at \$435,320. Ocean County, which ranks next in the extent of its fisheries to Monmouth and Cumberland, in 1897 had 1,620 persons employed, \$257,164 invested, and its products were valued at \$424,194. In 1898 it had 1,638 persons employed, \$254,923 invested, and the products were valued at \$350,681. The fisheries of Cape May County in 1897 employed 1,004 persons, the investment was \$99,427, and the value of the products \$234,926. In 1898 the number of persons employed was 985, the investment \$92,916, and the value of the products \$237,615. Salem County had, in 1897, 1,488 persons engaged in its fisheries, an investment of \$227,181, and products valued at \$232,096. In 1898 there were 1,382 persons employed, \$230,909 invested, and the value of the products was \$209,315. In the remaining counties the fisheries were less extensive, the largest number of persons employed in any of them for either year being 624 in Burlington, the largest amount of capital invested being \$110,064, and the greatest value of products \$142,431, in Camden.

The three tables which follow show the extent of the fisheries in each county of New Jersey in 1897 and 1898:

*Table showing, by counties, the number of persons employed in the fisheries of New Jersey in 1897 and 1898.*

| Counties.        | In vessel fisheries. |       | On vessels transporting. |       | In shore or boat fisheries. |       | Shoresmen. |       | Total. |        |
|------------------|----------------------|-------|--------------------------|-------|-----------------------------|-------|------------|-------|--------|--------|
|                  | 1897.                | 1898. | 1897.                    | 1898. | 1897.                       | 1898. | 1897.      | 1898. | 1897.  | 1898.  |
| Atlantic .....   | 142                  | 156   | 44                       | 40    | 943                         | 960   | 14         | 14    | 1,143  | 1,170  |
| Bergen .....     |                      |       |                          |       | 98                          | 98    | 7          | 7     | 105    | 105    |
| Burlington ..... | 8                    | 8     | 15                       | 15    | 569                         | 559   | 32         | 32    | 624    | 614    |
| Camden .....     | 154                  | 171   | 14                       |       | 381                         | 357   | 14         | 10    | 563    | 538    |
| Cape May .....   | 110                  | 100   | 16                       | 13    | 876                         | 870   | 2          | 2     | 1,004  | 985    |
| Cumberland ..... | 1,377                | 1,115 | 43                       | 52    | 709                         | 683   | 263        | 261   | 2,392  | 2,111  |
| Essex .....      |                      |       |                          |       |                             |       | 60         | 61    | 60     | 61     |
| Gloucester ..... | 3                    | 3     | 4                        | 6     | 315                         | 315   | 8          | 8     | 330    | 332    |
| Hudson .....     | 10                   | 12    | 3                        |       | 185                         | 215   | 5          | 5     | 203    | 232    |
| Hunterdon .....  |                      |       |                          |       | 91                          | 91    |            |       | 91     | 91     |
| Warren .....     |                      |       |                          |       | 105                         | 101   |            |       | 105    | 101    |
| Mercer .....     |                      |       |                          |       | 223                         | 230   |            |       | 223    | 230    |
| Middlesex .....  | 3                    | 7     | 13                       | 16    | 184                         | 204   | 4          | 4     | 204    | 231    |
| Monmouth .....   | 318                  | 311   | 85                       | 73    | 1,689                       | 1,744 | 117        | 151   | 2,209  | 2,279  |
| Ocean .....      | 39                   | 37    | 35                       | 26    | 1,520                       | 1,546 | 26         | 29    | 1,620  | 1,638  |
| Salem .....      | 5                    | 6     | 43                       | 46    | 1,388                       | 1,276 | 52         | 54    | 1,488  | 1,382  |
| Sussex .....     |                      |       |                          |       | 14                          | 14    |            |       | 14     | 14     |
| Union .....      |                      |       |                          |       | 110                         | 150   | 6          | 6     | 116    | 156    |
| Total .....      | 2,169                | 1,926 | 315                      | 287   | 9,400                       | 9,413 | 610        | 644   | 12,494 | 12,270 |



Table showing, by counties, the vessels, boats, and apparatus employed in the fisheries of New Jersey in 1897 and 1898.

| Designation.                        | Atlantic. |          |       |          | Bergen. |         |       |         | Burlington. |         |       |         |
|-------------------------------------|-----------|----------|-------|----------|---------|---------|-------|---------|-------------|---------|-------|---------|
|                                     | 1897.     |          | 1898. |          | 1897.   |         | 1898. |         | 1897.       |         | 1898. |         |
|                                     | No.       | Value.   | No.   | Value.   | No.     | Value.  | No.   | Value.  | No.         | Value.  | No.   | Value.  |
| Vessels fishing .....               | 46        | \$44,475 | 50    | \$48,775 |         |         |       |         | 2           | \$1,350 | 2     | \$1,350 |
| Tonnage .....                       | 391       |          | 436   |          |         |         |       |         | 24          |         | 24    |         |
| Outfit .....                        |           | 7,549    |       | 8,319    |         |         |       |         |             | 95      |       | 95      |
| Vessels transporting ..             | 19        | 17,050   | 17    | 15,300   |         |         |       |         | 6           | 3,600   | 6     | 3,600   |
| Tonnage .....                       | 296       |          | 278   |          |         |         |       |         | 124         |         | 124   |         |
| Outfit .....                        |           | 2,625    |       | 2,440    |         |         |       |         |             | 555     |       | 580     |
| Boats .....                         | 853       | 56,555   | 858   | 57,119   | 69      | \$2,920 | 68    | \$3,015 | 283         | 27,028  | 280   | 27,058  |
| Apparatus—vessel fisheries:         |           |          |       |          |         |         |       |         |             |         |       |         |
| Seines .....                        | 3         | 1,070    | 3     | 1,070    |         |         |       |         | 3           | 258     | 3     | 258     |
| Fyke nets .....                     | 4         | 100      | 6     | 150      |         |         |       |         | 8           | 260     | 8     | 260     |
| Lines, hand and trawl ..            |           | 865      |       | 967      |         |         |       |         |             |         |       |         |
| Oyster dredges and tongs ..         | 89        | 680      | 93    | 696      |         |         |       |         | 6           | 21      | 6     | 21      |
| Clam tongs and rakes ..             | 46        | 302      | 39    | 291      |         |         |       |         |             |         |       |         |
| Apparatus—shore fisheries:          |           |          |       |          |         |         |       |         |             |         |       |         |
| Seines .....                        | 76        | 3,135    | 79    | 3,135    |         |         |       |         | 46          | 5,635   | 46    | 5,570   |
| Gill nets .....                     | 113       | 568      | 110   | 535      | 665     | 9,224   | 700   | 9,103   | 168         | 4,968   | 170   | 4,972   |
| Pound nets and weirs ..             | 3         | 2,500    | 3     | 2,500    |         |         |       |         |             |         |       |         |
| Fyke nets .....                     | 51        | 930      | 70    | 875      |         |         |       |         | 340         | 2,040   | 344   | 2,100   |
| Stop nets .....                     | 4         | 45       |       |          |         |         |       |         |             |         |       |         |
| Lines, hand and trawl ..            |           | 738      |       | 738      |         |         |       |         |             | 3       |       | 3       |
| Pots, eel and lobster ..            | 18        | 15       | 18    | 15       | 94      | 141     | 100   | 109     |             |         |       |         |
| Oyster tongs, rakes, and dredges .. | 716       | 3,193    | 716   | 3,193    |         |         |       |         | 133         | 709     | 144   | 799     |
| Clam tongs, rakes, and hoes ..      | 823       | 4,975    | 836   | 5,160    |         |         |       |         | 1           | 22      | 1     | 22      |
| Minor apparatus .....               |           | 145      |       | 115      |         |         |       |         |             | 3       |       |         |
| Shore and accessory property ..     |           | 9,450    |       | 9,450    |         | 4,032   |       | 3,979   |             | 14,349  |       | 14,314  |
| Total .....                         |           | 156,965  |       | 160,843  |         | 16,317  |       | 16,206  |             | 60,896  |       | 61,002  |

| Designation.                        | Camden. |          |       |          | Cape May. |          |       |          | Cumberland. |           |       |           |
|-------------------------------------|---------|----------|-------|----------|-----------|----------|-------|----------|-------------|-----------|-------|-----------|
|                                     | 1897.   |          | 1898. |          | 1897.     |          | 1898. |          | 1897.       |           | 1898. |           |
|                                     | No.     | Value.   | No.   | Value.   | No.       | Value.   | No.   | Value.   | No.         | Value.    | No.   | Value.    |
| Vessels fishing .....               | 25      | \$30,450 | 28    | \$31,700 | 30        | \$38,100 | 32    | \$33,275 | 296         | \$291,101 | 274   | \$268,175 |
| Tonnage .....                       | 421     |          | 415   |          | 305       |          | 308   |          | 3,575       |           | 2,895 |           |
| Outfit .....                        |         | 5,969    |       | 7,288    |           | 5,027    |       | 5,318    |             | 52,410    |       | 45,188    |
| Vessels transporting ..             | 7       | 6,700    |       |          | 5         | 5,700    | 5     | 3,900    | 23          | 37,750    | 23    | 37,750    |
| Tonnage .....                       | 91      |          |       |          | 123       |          | 100   |          | 264         |           | 264   |           |
| Outfit .....                        |         | 644      |       |          |           | 700      |       | 570      |             | 3,034     |       | 3,034     |
| Boats .....                         | 170     | 15,893   | 158   | 14,675   | 657       | 23,777   | 664   | 24,397   | 357         | 44,048    | 340   | 39,588    |
| Apparatus—vessel fisheries:         |         |          |       |          |           |          |       |          |             |           |       |           |
| Seines .....                        |         |          |       |          | 2         | 530      | 1     | 30       |             |           |       |           |
| Fyke nets .....                     |         |          |       |          | 36        | 36       | 36    | 36       |             |           |       |           |
| Stop nets .....                     |         |          |       |          | 1         | 100      | 1     | 100      |             |           |       |           |
| Lines, hand and trawl ..            |         | 17       |       | 17       |           | 90       |       | 80       |             |           |       | 25        |
| Pots, eel and lobster ..            |         |          |       |          | 35        | 28       | 35    | 28       |             |           |       |           |
| Oyster dredges and tongs ..         | 92      | 2,140    | 112   | 2,760    | 64        | 1,190    | 74    | 1,462    | 1,082       | 23,825    | 1,016 | 25,405    |
| Clam tongs and rakes ..             |         |          |       |          | 2         | 19       | 2     | 19       | 28          | 146       | 2     | 16        |
| Apparatus—shore fisheries:          |         |          |       |          |           |          |       |          |             |           |       |           |
| Seines .....                        | 15      | 3,825    | 15    | 2,745    | 85        | 2,122    | 93    | 2,353    | 26          | 810       | 21    | 670       |
| Gill nets .....                     | 112     | 3,611    | 112   | 3,611    | 25        | 1,645    | 23    | 1,470    | 161         | 13,080    | 171   | 13,465    |
| Pound nets and weirs ..             |         |          |       |          | 111       | 6,945    | 109   | 6,085    |             |           |       |           |
| Fyke nets .....                     | 172     | 225      | 172   | 225      | 12        | 310      | 20    | 505      | 256         | 250       | 250   | 244       |
| Stop nets .....                     | 10      | 470      | 10    | 470      |           |          |       |          | 6           | 300       | 5     | 200       |
| Lines, hand and trawl ..            |         | 5        |       | 5        |           | 1,073    |       | 1,310    |             | 7         |       | 7         |
| Pots, eel and lobster ..            |         |          |       |          | 30        | 10       | 30    | 10       |             |           |       |           |
| Oyster tongs, rakes, and dredges .. |         |          |       |          | 122       | 618      | 124   | 540      | 308         | 3,904     | 277   | 3,690     |
| Clam tongs, rakes, and hoes ..      |         |          |       |          | 332       | 2,543    | 324   | 2,561    |             |           |       |           |
| Minor apparatus .....               |         |          |       |          |           | 214      |       | 32       |             |           |       |           |
| Shore and accessory property ..     |         | 40,115   |       | 24,625   |           | 8,650    |       | 8,835    |             | 194,623   |       | 194,723   |
| Cash capital .....                  |         |          |       |          |           |          |       |          |             | 13,500    |       | 13,500    |
| Total .....                         |         | 110,064  |       | 88,121   |           | 99,427   |       | 92,916   |             | 678,788   |       | 645,680   |



Table showing, by counties, the vessels, boats, and apparatus employed in the fisheries of New Jersey in 1897 and 1898—Continued.

| Designation.                           | Essex.   |          | Gloucester. |        |       |        | Hudson. |          |       |          |
|--|----------|----------|-------------|--------|-------|--------|---------|----------|-------|----------|
|  | 1897.    | 1898.    | 1897.       |        | 1898. |        | 1897.   |          | 1898. |          |
|  | Value.   | Value.   | No.         | Value. | No.   | Value. | No.     | Value.   | No.   | Value.   |
| Vessels fishing .....                  |          |          | 1           | \$300  | 1     | \$300  | 3       | \$13,000 | 4     | \$13,600 |
| Tonnage .....                          |          |          | 6           |        | 6     |        | 143     |          | 154   |          |
| Outfit .....                           |          |          |             | 162    |       | 120    |         | 2,085    |       | 2,090    |
| Vessels transporting .....             |          |          | 2           | 950    | 3     | 1,950  | 1       | 3,000    |       |          |
| Tonnage .....                          |          |          | 19          |        | 36    |        | 27      |          |       |          |
| Outfit .....                           |          |          |             | 110    |       | 180    |         | 225      |       |          |
| Boats .....                            |          |          | 150         | 14,715 | 159   | 15,290 | 102     | 5,575    | 118   | 6,375    |
| Apparatus—vessel fisheries:            |          |          |             |        |       |        |         |          |       |          |
| Seines .....                           |          |          | 1           | 100    | 1     | 100    |         |          |       |          |
| Stop nets .....                        |          |          | 1           | 300    | 1     | 300    |         |          |       |          |
| Pots, eel and lobster .....            |          |          |             |        |       |        | 50      | 70       | 100   | 135      |
| Oyster dredges and tongs .....         |          |          |             |        |       |        | 12      | 1,190    | 12    | 1,190    |
| Crab dredges .....                     |          |          |             |        |       |        | 10      | 60       |       |          |
| Apparatus—shore fisheries:             |          |          |             |        |       |        |         |          |       |          |
| Seines .....                           |          |          | 9           | 1,145  | 9     | 1,145  |         |          |       |          |
| Gill nets .....                        |          |          | 96          | 11,030 | 96    | 11,030 | 634     | 6,530    | 634   | 6,530    |
| Fyke nets .....                        |          |          | 520         | 825    | 520   | 825    | 248     | 3,635    | 253   | 3,593    |
| Stop nets .....                        |          |          | 24          | 2,063  | 24    | 2,063  |         |          |       |          |
| Pots, eel and lobster .....            |          |          |             |        |       |        | 240     | 305      | 280   | 345      |
| Oyster tongs, rakes, and dredges ..... |          |          |             |        |       |        | 70      | 350      | 100   | 500      |
| Minor apparatus .....                  |          |          |             | 36     |       | 36     |         |          |       |          |
| Shore and accessory property .....     | \$26,000 | \$26,000 |             | 8,485  |       | 8,500  |         | 8,020    |       | 8,025    |
| Cash capital .....                     | 24,500   | 24,500   |             |        |       |        |         |          |       |          |
| Total .....                            | 50,500   | 50,500   |             | 40,221 |       | 41,839 |         | 44,045   |       | 42,383   |

| Designation.                           | Hunterdon. |        |       |        | Mercer. |         |       |         | Middlesex. |        |       |         |
|--|------------|--------|-------|--------|---------|---------|-------|---------|------------|--------|-------|---------|
|  | 1897.      |        | 1898. |        | 1897.   |         | 1898. |         | 1897.      |        | 1898. |         |
|  | No.        | Value. | No.   | Value. | No.     | Value.  | No.   | Value.  | No.        | Value. | No.   | Value.  |
| Vessels fishing .....                  |            |        |       |        |         |         |       |         | 2          | \$750  | 4     | \$1,400 |
| Tonnage .....                          |            |        |       |        |         |         |       |         | 15         |        | 26    |         |
| Outfit .....                           |            |        |       |        |         |         |       |         |            | 170    |       | 441     |
| Vessels transporting .....             |            |        |       |        |         |         |       |         | 4          | 6,200  | 5     | 6,700   |
| Tonnage .....                          |            |        |       |        |         |         |       |         | 65         |        | 76    |         |
| Outfit .....                           |            |        |       |        |         |         |       |         |            | 780    |       | 1,165   |
| Boats .....                            | 26         | \$707  | 26    | \$707  | 92      | \$2,323 | 96    | \$2,433 | 120        | 6,388  | 135   | 6,740   |
| Apparatus—vessel fisheries:            |            |        |       |        |         |         |       |         |            |        |       |         |
| Clam tongs and rakes .....             |            |        |       |        |         |         |       |         | 5          | 60     | 17    | 204     |
| Apparatus—shore fisheries:             |            |        |       |        |         |         |       |         |            |        |       |         |
| Seines .....                           | 21         | 1,740  | 21    | 1,740  | 30      | 2,970   | 33    | 3,135   | 5          | 3,150  | 6     | 3,350   |
| Gill nets .....                        |            |        |       |        | 51      | 940     | 51    | 940     | 15         | 90     | 15    | 90      |
| Pound nets and weirs .....             |            |        |       |        |         |         |       |         | 1          | 300    |       |         |
| Fyke nets .....                        |            |        |       |        | 380     | 760     | 380   | 760     | 14         | 530    | 15    | 570     |
| Lines, hand and trawl .....            |            |        |       |        |         |         |       |         |            | 2      |       | 2       |
| Pots, eel and lobster .....            |            | 18     |       | 18     |         |         |       |         | 112        | 141    | 172   | 216     |
| Oyster tongs, rakes, and dredges ..... |            |        |       |        |         |         |       |         | 154        | 828    | 169   | 903     |
| Clam tongs, rakes, and hoes .....      |            |        |       |        |         |         |       |         | 9          | 103    | 9     | 103     |
| Shore and accessory property .....     |            | 7,670  |       | 7,670  |         | 7,490   |       | 7,665   |            | 10,938 |       | 10,938  |
| Cash capital .....                     |            |        |       |        |         |         |       |         |            | 19,600 |       | 19,700  |
| Total .....                            |            | 10,135 |       | 10,135 |         | 14,483  |       | 14,933  |            | 50,030 |       | 52,522  |

| Designation.                           | Union. |         |       |         | Warren. |        |       |        |
|--|--------|---------|-------|---------|---------|--------|-------|--------|
|  | 1897.  |         | 1898. |         | 1897.   |        | 1898. |        |
|  | No.    | Value.  | No.   | Value.  | No.     | Value. | No.   | Value. |
| Boats .....                            | 55     | \$2,750 | 75    | \$3,750 | 29      | \$475  | 28    | \$460  |
| Apparatus—shore fisheries:             |        |         |       |         |         |        |       |        |
| Seines .....                           |        |         |       |         | 23      | 957    | 22    | 917    |
| Oyster tongs, rakes, and dredges ..... | 110    | 550     | 150   | 750     |         |        |       |        |
| Minor apparatus .....                  |        |         |       |         |         | 120    |       | 120    |
| Shore and accessory property .....     |        | 500     |       | 500     |         | 3,245  |       | 3,245  |
| Cash capital .....                     |        | 500     |       | 500     |         |        |       |        |
| Total .....                            |        | 4,300   |       | 5,500   |         | 4,797  |       | 4,742  |

Table showing, by counties, the vessels, boats, and apparatus employed in the fisheries of New Jersey in 1897 and 1898—Continued.

| Designation.                           | Monmouth. |          |       |          | Ocean. |          |       |         |
|--|-----------|----------|-------|----------|--------|----------|-------|---------|
|  | 1897.     |          | 1898. |          | 1897.  |          | 1898. |         |
|  | No.       | Value.   | No.   | Value.   | No.    | Value.   | No.   | Value.  |
| Vessels fishing .....                  | 125       | \$68,850 | 123   | \$59,100 | 10     | \$10,300 | 11    | \$7,300 |
| Tonnage .....                          | 1,159     |          | 1,159 |          | 120    |          | 115   |         |
| Outfit .....                           |           | 19,675   |       | 19,592   |        | 3,152    |       | 3,382   |
| Vessels transporting .....             | 34        | 3,600    | 29    | 34,700   | 16     | 10,925   | 12    | 8,525   |
| Tonnage .....                          | 501       |          | 417   |          | 183    |          | 125   |         |
| Outfit .....                           |           | 6,162    |       | 5,853    |        | 1,687    |       | 1,467   |
| Boats .....                            | 1,254     | 61,572   | 1,322 | 64,183   | 1,369  | 131,933  | 1,391 | 128,329 |
| Apparatus—vessel fisheries:            |           |          |       |          |        |          |       |         |
| Seines .....                           | 7         | 2,810    | 7     | 2,680    | 1      | 500      | 1     | 450     |
| Gill nets .....                        | 4         | 400      | 10    | 580      | 2      | 240      | 3     | 320     |
| Fyke nets .....                        | 102       | 918      | 120   | 1,080    |        |          |       |         |
| Lines, hand and trawl .....            |           | 10       |       | 5        |        |          |       |         |
| Pots, eel and lobster .....            |           |          |       |          | 90     | 45       | 180   | 90      |
| Oyster dredges and tongs .....         | 43        | 1,917    | 50    | 1,312    |        |          |       |         |
| Clam tongs and rakes .....             | 460       | 5,735    | 461   | 5,765    | 43     | 173      | 43    | 173     |
| Crab dredges .....                     | 134       | 552      | 182   | 736      |        |          |       |         |
| Apparatus—shore fisheries:             |           |          |       |          |        |          |       |         |
| Seines .....                           | 17        | 815      | 21    | 1,060    | 117    | 5,532    | 126   | 5,899   |
| Gill nets .....                        | 836       | 7,062    | 760   | 6,922    | 690    | 7,375    | 861   | 9,459   |
| Pound nets and weirs .....             | 63        | 85,300   | 59    | 77,800   | 2      | 3,950    | 1     | 2,500   |
| Fyke nets .....                        | 273       | 4,385    | 272   | 4,365    | 140    | 1,234    | 369   | 2,882   |
| Lines, hand and trawl .....            |           | 3,273    |       | 3,642    |        | 278      |       | 615     |
| Pots, eel and lobster .....            | 1,910     | 3,046    | 1,974 | 3,180    | 1,905  | 1,375    | 1,811 | 1,234   |
| Oyster tongs, rakes, and dredges ..... | 415       | 2,602    | 423   | 2,695    | 2,795  | 13,968   | 2,805 | 14,024  |
| Clam tongs, rakes, and hoes .....      | 1,484     | 8,177    | 1,536 | 8,582    | 814    | 4,026    | 817   | 4,101   |
| Minor apparatus .....                  |           | 139      |       | 133      |        | 246      |       | 248     |
| Shore and accessory property .....     |           | 161,445  |       | 170,609  |        | 45,225   |       | 48,925  |
| Cash capital .....                     |           | 97,000   |       | 89,200   |        | 15,000   |       | 15,000  |
| Total .....                            |           | 545,445  |       | 563,774  |        | 257,164  |       | 254,923 |

| Designation.                       | Salem. |         |       |         | Sussex. |        |       |        |
|------------------------------------|--------|---------|-------|---------|---------|--------|-------|--------|
|                                    | 1897.  |         | 1898. |         | 1897.   |        | 1898. |        |
|                                    | No.    | Value.  | No.   | Value.  | No.     | Value. | No.   | Value. |
| Vessels fishing .....              | 2      | \$900   | 2     | \$900   |         |        |       |        |
| Tonnage .....                      | 26     |         | 26    |         |         |        |       |        |
| Outfit .....                       |        | 207     |       | 328     |         |        |       |        |
| Vessels transporting .....         | 16     | 54,400  | 17    | 56,350  |         |        |       |        |
| Tonnage .....                      | 574    |         | 599   |         |         |        |       |        |
| Outfit .....                       |        | 4,370   |       | 4,475   |         |        |       |        |
| Boats .....                        | 776    | 88,340  | 703   | 89,710  | 3       | \$60   | 3     | \$60   |
| Apparatus—vessel fisheries:        |        |         |       |         |         |        |       |        |
| Lines, hand and trawl .....        |        | 2       |       | 2       |         |        |       |        |
| Oyster dredges and tongs .....     |        |         | 4     | 72      |         |        |       |        |
| Apparatus—shore fisheries:         |        |         |       |         |         |        |       |        |
| Seines .....                       | 32     | 2,680   | 32    | 2,680   | 3       | 110    | 3     | 110    |
| Gill nets .....                    | 570    | 57,395  | 588   | 58,715  |         |        |       |        |
| Stop nets .....                    | 36     | 1,900   | 26    | 1,500   |         |        |       |        |
| Lines, hand and trawl .....        |        | 4       |       | 4       |         |        |       |        |
| Minor apparatus .....              |        | 253     |       | 53      |         |        |       |        |
| Shore and accessory property ..... |        | 13,430  |       | 12,720  |         | 325    |       | 325    |
| Cash capital .....                 |        | 3,300   |       | 3,400   |         |        |       |        |
| Total .....                        |        | 227,181 |       | 230,909 |         | 495    |       | 495    |

Table showing, by counties, the yield of the fisheries of New Jersey in 1897 and 1898.

| Species.               | Atlantic.  |         |            |         | Burlington. |         |           |        |
|------------------------|------------|---------|------------|---------|-------------|---------|-----------|--------|
|                        | 1897.      |         | 1898.      |         | 1897.       |         | 1898.     |        |
|                        | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.        | Value.  | Lbs.      | Value. |
| Alewives.....          | 15,600     | \$78    | 32,780     | \$142   | 520,500     | \$1,785 | 78,000    | \$315  |
| Blue-fish.....         | 136,200    | 5,783   | 143,700    | 6,103   |             |         |           |        |
| Butter-fish.....       | 10,000     | 500     | 10,000     | 500     |             |         |           |        |
| Carp.....              |            |         |            |         | 74,900      | 3,956   | 27,050    | 1,431  |
| Cat-fish.....          | 500        | 35      | 800        | 48      | 48,870      | 2,230   | 49,626    | 2,254  |
| Cod.....               | 1,056,500  | 33,768  | 1,002,500  | 35,668  |             |         |           |        |
| Croakers.....          | 40,600     | 581     | 39,870     | 615     |             |         |           |        |
| Drum.....              | 3,400      | 34      | 3,400      | 34      |             |         |           |        |
| Eels.....              | 159,131    | 6,945   | 160,466    | 6,975   | 24,999      | 1,338   | 24,373    | 1,276  |
| Flounders.....         | 263,310    | 6,748   | 248,320    | 6,351   | 980         | 49      | 900       | 45     |
| Haddock.....           | 11,525     | 687     | 11,825     | 722     |             |         |           |        |
| Hake.....              | 9,700      | 398     | 9,900      | 407     |             |         |           |        |
| King-fish.....         | 21,280     | 1,086   | 21,600     | 1,099   |             |         |           |        |
| Menhaden.....          | 5,225,625  | 10,887  | 3,104,130  | 6,467   |             |         |           |        |
| Mullet, fresh.....     | 1,600      | 88      | 1,300      | 73      |             |         |           |        |
| Mullet, salted.....    | 800        | 40      | 500        | 25      |             |         |           |        |
| Perch, white.....      | 149,215    | 10,499  | 120,480    | 8,512   | 80,420      | 5,103   | 64,105    | 3,846  |
| Perch, yellow.....     |            |         |            |         | 2,060       | 106     | 1,500     | 78     |
| Pike and pickerel..... | 510        | 23      | 485        | 21      | 500         | 30      | 375       | 28     |
| Salmon.....            |            |         |            |         | 48          | 12      | 31        | 12     |
| Scup.....              | 55,000     | 1,145   | 61,950     | 1,310   |             |         |           |        |
| Sea bass.....          | 369,050    | 14,459  | 384,300    | 15,038  |             |         |           |        |
| Shad.....              | 1,000      | 74      | 200        | 15      | 1,164,560   | 29,762  | 957,948   | 21,514 |
| Sheepshead.....        | 39,735     | 7,161   | 32,780     | 5,862   |             |         |           |        |
| Spots.....             | 1,750      | 30      | 1,750      | 30      |             |         |           |        |
| Squeteague, fresh..... | 1,155,700  | 34,651  | 1,278,225  | 37,737  | 13,700      | 685     | 18,800    | 940    |
| Striped bass.....      | 46,830     | 5,888   | 28,207     | 3,550   | 21,320      | 2,768   | 17,585    | 2,169  |
| Sturgeon.....          |            |         |            |         | 15,960      | 827     | 7,790     | 459    |
| Suckers.....           | 1,100      | 32      | 2,100      | 77      | 55,031      | 2,597   | 57,352    | 2,629  |
| Tautog.....            | 700        | 32      | 700        | 32      |             |         |           |        |
| Caviar.....            |            |         |            |         | 6,060       | 2,290   | 2,625     | 1,687  |
| Crabs, hard.....       | 154,000    | 4,650   | 154,000    | 4,650   |             |         |           |        |
| Crabs, soft.....       | 6,000      | 775     | 6,000      | 775     |             |         |           |        |
| Shrimp.....            | 600        | 200     | 600        | 200     |             |         |           |        |
| Oysters, market.....   | 1,230,845  | 187,866 | 1,197,280  | 182,842 | 186,410     | 20,974  | 165,550   | 18,641 |
| Oysters, seed.....     | 350,455    | 14,554  | 324,835    | 15,196  | 24,500      | 1,200   | 24,500    | 1,200  |
| Clams, hard.....       | 913,667    | 96,008  | 850,116    | 92,709  | 81,700      | 7,821   | 76,200    | 7,294  |
| Mussels.....           | 2,520,000  | 1,575   | 2,360,000  | 1,475   |             |         |           |        |
| Terrapin.....          | 1,103      | 626     |            |         | 2,431       | 309     |           |        |
| Turtles.....           | 600        | 36      | 1,000      | 60      | 400         | 34      |           |        |
| Total.....             | 13,953,631 | 447,942 | 11,596,099 | 435,320 | 2,325,349   | 83,876  | 1,574,310 | 65,813 |

| Species.             | Bergen. |        |         |        | Camden.   |         |           |         |
|----------------------|---------|--------|---------|--------|-----------|---------|-----------|---------|
|                      | 1897.   |        | 1898.   |        | 1897.     |         | 1898.     |         |
|                      | Lbs.    | Value. | Lbs.    | Value. | Lbs.      | Value.  | Lbs.      | Value.  |
| Alewives.....        |         |        |         |        | 490,200   | \$1,602 | 202,250   | \$823   |
| Blue-fish.....       |         |        |         |        | 7,500     | 300     | 6,000     | 240     |
| Carp.....            |         |        |         |        | 73,558    | 4,382   | 25,488    | 1,521   |
| Cat-fish.....        |         |        |         |        | 25,164    | 1,258   | 25,291    | 1,264   |
| Eels.....            | 10,666  | \$775  | 18,066  | \$991  | 13,466    | 808     | 11,598    | 696     |
| Flounders.....       |         |        |         |        | 5,200     | 130     | 5,000     | 125     |
| Perch, white.....    |         |        |         |        | 1,846     | 81      | 1,523     | 65      |
| Perch, yellow.....   |         |        |         |        | 1,125     | 58      | 780       | 40      |
| Salmon.....          |         |        |         |        | 794       | 264     |           |         |
| Scup.....            |         |        |         |        | 6,000     | 150     | 7,200     | 180     |
| Sea bass.....        |         |        |         |        | 120,000   | 4,800   | 112,000   | 4,480   |
| Shad.....            | 460,800 | 17,934 | 519,420 | 18,510 | 1,404,515 | 33,434  | 1,014,330 | 17,328  |
| Striped bass.....    | 11,000  | 970    | 21,750  | 1,895  | 9,000     | 900     | 2,900     | 290     |
| Sturgeon.....        |         |        |         |        | 1,000     | 25      | 450       | 12      |
| Suckers.....         |         |        |         |        | 11,330    | 591     | 9,426     | 495     |
| Oysters, market..... |         |        |         |        | 409,626   | 71,958  | 637,903   | 85,462  |
| Oysters, seed.....   |         |        |         |        | 777,700   | 11,346  | 686,238   | 29,410  |
| Total.....           | 482,466 | 19,679 | 559,236 | 21,396 | 3,358,024 | 132,087 | 2,748,377 | 142,431 |

Table showing the yield of the fisheries of New Jersey in 1897 and 1898—Cont'd.

| Species.                  | Cape May. |         |           |         | Cumberland. |         |            |         |
|---------------------------|-----------|---------|-----------|---------|-------------|---------|------------|---------|
|                           | 1897.     |         | 1898.     |         | 1897.       |         | 1898.      |         |
|                           | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.        | Value.  | Lbs.       | Value.  |
| Albacore.....             | 5,970     | \$150   | 6,800     | \$176   |             |         |            |         |
| Alewives.....             | 69,700    | 1,316   | 67,050    | 1,376   | 46,700      | \$277   | 63,600     | \$336   |
| Blue-fish.....            | 244,188   | 10,991  | 327,450   | 14,873  |             |         |            |         |
| Bonito.....               | 3,700     | 165     | 4,700     | 209     |             |         |            |         |
| Butter-fish.....          | 44,657    | 1,637   | 41,867    | 1,500   |             |         |            |         |
| Carp.....                 | 10,300    | 309     | 2,914     | 87      | 41,065      | 1,297   | 16,525     | 517     |
| Cat-fish.....             | 3,205     | 194     | 3,815     | 231     | 38,354      | 2,083   | 39,170     | 2,111   |
| Cod.....                  | 170,840   | 4,134   | 208,450   | 5,506   |             |         |            |         |
| Croakers.....             | 167,700   | 3,032   | 225,300   | 4,050   |             |         | 6,000      | 150     |
| Drum.....                 | 77,000    | 780     | 77,200    | 767     |             |         |            |         |
| Eels.....                 | 104,364   | 4,993   | 96,930    | 4,655   | 7,733       | 324     | 6,100      | 352     |
| Flounders.....            | 70,510    | 2,111   | 80,800    | 2,429   |             |         |            |         |
| Hake.....                 | 16,935    | 458     | 24,200    | 515     |             |         |            |         |
| Hickory shad.....         | 2,000     | 160     | 2,000     | 160     |             |         |            |         |
| King-fish.....            | 14,392    | 1,719   | 15,419    | 1,907   |             |         |            |         |
| Menhaden.....             | 306,000   | 808     | 80,000    | 538     |             |         |            |         |
| Mullet, fresh.....        | 19,575    | 403     | 21,700    | 454     |             |         |            |         |
| Perch, white.....         | 31,680    | 2,415   | 32,655    | 2,482   | 15,392      | 744     | 15,832     | 761     |
| Perch, yellow.....        | 650       | 39      | 570       | 34      |             |         |            |         |
| Pompano.....              | 40        | 10      | 40        | 10      |             |         |            |         |
| Salmon.....               |           |         |           |         |             |         | 22         | 10      |
| Scup.....                 | 166,650   | 4,798   | 223,665   | 6,403   |             |         | 200        | 5       |
| Sea bass.....             | 468,365   | 17,545  | 582,950   | 21,900  |             |         | 3,000      | 120     |
| Shad.....                 | 3,882     | 174     | 3,480     | 154     | 593,230     | 17,509  | 668,300    | 17,150  |
| Sheepshead.....           | 2,450     | 468     | 2,520     | 478     |             |         |            |         |
| Spanish mackerel.....     | 4,280     | 738     | 7,500     | 1,175   |             |         |            |         |
| Spots.....                | 14,250    | 516     | 14,800    | 550     |             |         |            |         |
| Squeteague, fresh.....    | 1,004,668 | 25,121  | 1,161,285 | 28,397  | 80,330      | 3,453   | 78,940     | 3,193   |
| Squeteague, salted.....   | 16,700    | 961     | 16,650    | 957     |             |         |            |         |
| Striped bass.....         | 50,453    | 5,091   | 47,463    | 3,701   | 59,716      | 4,338   | 60,103     | 4,344   |
| Sturgeon.....             | 33,250    | 1,647   | 16,710    | 756     | 243,925     | 6,240   | 315,083    | 5,088   |
| Suckers.....              | 500       | 15      | 600       | 18      | 5,840       | 210     | 5,043      | 185     |
| Tautog.....               | 400       | 12      | 400       | 12      |             |         |            |         |
| Tomcod or frost-fish..... | 200       | 6       | 200       | 6       |             |         |            |         |
| Caviar.....               | 7,020     | 2,844   | 2,340     | 1,482   | 63,760      | 21,253  | 47,723     | 26,517  |
| Crabs, hard.....          | 29,587    | 868     | 31,096    | 920     |             |         |            |         |
| King crabs.....           | 976,800   | 4,125   | 946,190   | 4,053   | 148,000     | 370     | 116,000    | 290     |
| Oysters, market.....      | 462,616   | 66,906  | 505,981   | 71,625  | 3,787,896   | 654,245 | 4,037,782  | 586,427 |
| Oysters, seed.....        | 221,900   | 4,471   | 19,775    | 860     | 9,144,310   | 147,141 | 5,179,384  | 219,750 |
| Clams, hard.....          | 701,262   | 58,901  | 615,997   | 52,149  | 2,000       | 250     | 600        | 75      |
| Terrapin.....             | 7,613     | 3,820   |           |         |             |         |            |         |
| Turtles.....              | 1,500     | 75      | 1,200     | 60      | 2,700       | 216     | 2,100      | 168     |
| Total.....                | 5,537,752 | 234,926 | 5,520,662 | 237,615 | 14,280,951  | 859,950 | 10,661,507 | 867,549 |

| Species.               | Mercer. |        |         |        | Middlesex. |        |           |        |
|------------------------|---------|--------|---------|--------|------------|--------|-----------|--------|
|                        | 1897.   |        | 1898.   |        | 1897.      |        | 1898.     |        |
|                        | Lbs.    | Value. | Lbs.    | Value. | Lbs.       | Value. | Lbs.      | Value. |
| Alewives.....          | 7,500   | \$55   | 6,000   | \$45   | 48,000     | \$80   | 6,000     | \$12   |
| Blue-fish.....         |         |        |         |        | 12,300     | 440    | 12,800    | 448    |
| Carp.....              | 3,810   | 200    | 2,718   | 138    |            |        |           |        |
| Cat-fish.....          | 29,630  | 1,396  | 30,664  | 1,659  |            |        |           |        |
| Eels.....              | 15,756  | 945    | 16,946  | 1,017  | 14,399     | 864    | 15,733    | 950    |
| Flounders.....         |         |        |         |        | 3,000      | 160    | 3,200     | 172    |
| Menhaden.....          |         |        |         |        | 564,400    | 907    | 658,400   | 1,113  |
| Perch, white.....      | 800     | 32     | 600     | 24     | 100        | 10     | 2,100     | 110    |
| Perch, yellow.....     | 200     | 8      | 250     | 10     |            |        |           |        |
| Salmon.....            | 47      | 12     | 7       | 1      |            |        |           |        |
| Shad.....              | 311,600 | 12,131 | 242,040 | 12,630 | 11,176     | 624    | 13,102    | 623    |
| Squeteague, fresh..... |         |        |         |        | 15,800     | 493    | 16,500    | 730    |
| Striped bass.....      | 3,460   | 333    | 4,455   | 402    | 1,300      | 86     | 2,000     | 174    |
| Sturgeon.....          |         |        | 60      | 4      |            |        |           |        |
| Suckers.....           | 22,120  | 1,073  | 23,505  | 1,129  |            |        |           |        |
| Crabs, hard.....       |         |        |         |        |            |        | 1,200     | 45     |
| Oysters, market.....   |         |        |         |        | 151,480    | 21,758 | 326,550   | 45,298 |
| Oysters, seed.....     |         |        |         |        | 380,700    | 20,515 | 559,720   | 30,036 |
| Clams, hard.....       |         |        |         |        | 12,816     | 1,720  | 25,480    | 3,110  |
| Scallops.....          |         |        |         |        | 5,400      | 300    | 5,400     | 300    |
| Total.....             | 394,923 | 16,185 | 327,245 | 17,059 | 1,220,871  | 47,957 | 1,648,185 | 63,121 |

Table showing the yield of the fisheries of New Jersey in 1897 and 1898—Cont'd.

| Species.             | Gloucester. |        |           |        | Hudson.   |        |           |        | Hunterdon. |       |        |       |
|----------------------|-------------|--------|-----------|--------|-----------|--------|-----------|--------|------------|-------|--------|-------|
|                      | 1897.       |        | 1898.     |        | 1897.     |        | 1898.     |        | 1897.      |       | 1898.  |       |
|                      | Lbs.        | Val.   | Lbs.      | Val.   | Lbs.      | Val.   | Lbs.      | Val.   | Lbs.       | Val.  | Lbs.   | Val.  |
| Alewives.....        | 54,390      | \$227  | 55,255    | \$232  |           |        |           |        |            |       |        |       |
| Black bass.....      |             |        |           |        |           |        |           |        | 150        | \$12  | 100    | \$8   |
| Carp.....            | 189,326     | 9,646  | 74,800    | 4,488  |           |        |           |        | 1,350      | 25    | 1,088  | 20    |
| Cat-fish.....        | 40,341      | 2,104  | 40,393    | 2,104  |           |        |           |        | 550        | 26    | 510    | 23    |
| Eels.....            | 22,177      | 1,331  | 23,866    | 1,432  | 5,000     | \$285  | 8,333     | \$470  | 133        | 10    | 133    | 10    |
| Perch, white.....    | 434         | 20     | 575       | 25     |           |        |           |        |            |       |        |       |
| Perch, yellow.....   | 925         | 46     | 910       | 45     |           |        |           |        |            |       |        |       |
| Salmon.....          | 24          | 12     |           |        |           |        |           |        | 151        | 20    |        |       |
| Shad.....            | 1,468,920   | 33,189 | 1,571,450 | 30,418 | 734,800   | 26,225 | 690,500   | 22,843 | 108,400    | 6,349 | 77,616 | 4,590 |
| Striped bass.....    | 800         | 80     | 1,200     | 120    | 1,450     | 163    | 990       | 105    | 1,195      | 120   | 2,055  | 206   |
| Suckers.....         | 7,034       | 322    | 8,331     | 386    |           |        |           |        | 8,800      | 397   | 8,050  | 364   |
| Crabs, hard.....     |             |        |           |        | 26,667    | 800    |           |        |            |       |        |       |
| Lobsters.....        |             |        |           |        | 31,200    | 2,190  | 41,250    | 3,340  |            |       |        |       |
| Oysters, market..... |             |        |           |        |           |        |           |        |            |       |        |       |
| Oysters, seed.....   |             |        |           |        | 385,000   | 28,750 | 420,000   | 32,500 |            |       |        |       |
|                      |             |        |           |        | 161,000   | 8,650  | 392,000   | 23,000 |            |       |        |       |
| Total....            | 1,784,371   | 46,977 | 1,776,780 | 39,250 | 1,345,117 | 67,063 | 1,553,073 | 82,258 | 120,729    | 6,959 | 89,552 | 5,221 |

| Species.                  | Monmouth.  |         |            |         | Ocean.     |         |           |         |
|---------------------------|------------|---------|------------|---------|------------|---------|-----------|---------|
|                           | 1897.      |         | 1898.      |         | 1897.      |         | 1898.     |         |
|                           | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.      | Value.  |
| Albacore.....             | 7,150      | \$134   | 9,750      | \$157   | 1,000      | \$10    |           |         |
| Alewives.....             | 35,112     | 606     | 27,362     | 426     | 713,100    | 3,250   | 1,011,650 | \$4,600 |
| Blue-fish.....            | 4,264,400  | 113,197 | 4,163,070  | 125,548 | 499,585    | 17,546  | 424,065   | 16,408  |
| Bonito.....               | 336,800    | 9,011   | 332,422    | 8,784   | 18,200     | 429     | 39,700    | 950     |
| Butter-fish.....          | 152,900    | 3,535   | 170,060    | 4,061   | 9,500      | 195     | 40,700    | 2,019   |
| Cat-fish.....             |            |         |            |         | 500        | 45      | 1,000     | 75      |
| Cero.....                 | 4,950      | 154     | 5,170      | 159     | 150        | 6       | 500       | 20      |
| Cod.....                  | 2,222,000  | 32,620  | 1,200,200  | 34,920  | 32,550     | 686     | 171,840   | 6,280   |
| Croakers.....             | 60,800     | 1,174   | 130,810    | 2,356   | 11,700     | 234     | 10,340    | 204     |
| Drum.....                 | 2,500      | 28      | 2,044      | 21      |            |         |           |         |
| Eels.....                 | 216,732    | 11,149  | 239,729    | 12,515  | 149,783    | 5,663   | 172,549   | 6,586   |
| Flounders.....            | 746,975    | 15,426  | 823,625    | 17,768  | 135,750    | 4,394   | 171,890   | 5,769   |
| Haddock.....              | 154,400    | 2,347   | 214,400    | 6,547   | 1,450      | 26      | 13,825    | 537     |
| Hake.....                 | 41,300     | 646     | 56,942     | 1,163   | 1,800      | 36      | 7,000     | 274     |
| Hickory shad.....         | 1,719      | 69      | 1,500      | 60      |            |         |           |         |
| King-fish.....            | 6,650      | 864     | 6,108      | 808     | 705        | 97      | 875       | 121     |
| Mackerel.....             | 24,300     | 1,628   | 16,480     | 1,322   |            |         |           |         |
| Menhaden.....             | 20,223,800 | 50,266  | 16,413,500 | 43,078  | 4,233,000  | 7,188   | 1,937,500 | 2,530   |
| Mullet, fresh.....        | 100        | 6       | 3,500      | 110     |            |         | 1,000     | 30      |
| Perch, white.....         | 7,450      | 467     | 5,950      | 363     | 307,855    | 18,484  | 385,682   | 23,113  |
| Pike and pickerel.....    |            |         |            |         | 1,760      | 99      | 1,700     | 106     |
| Pollock.....              | 300        | 9       | 300        | 9       |            |         |           |         |
| Salmon.....               | 1,021      | 358     | 1,025      | 360     |            |         |           |         |
| Scup.....                 | 514,300    | 7,406   | 316,150    | 5,411   | 15,500     | 317     | 13,000    | 263     |
| Sea bass.....             | 997,600    | 31,716  | 902,618    | 31,166  | 176,465    | 5,761   | 204,665   | 7,185   |
| Shad.....                 | 167,300    | 8,996   | 123,676    | 6,428   | 71,400     | 3,953   | 65,900    | 3,540   |
| Sheepshead.....           | 7,050      | 867     | 7,265      | 910     | 600        | 69      | 170       | 23      |
| Skates.....               | 11,650     | 291     | 12,750     | 319     |            |         |           |         |
| Spanish mackerel.....     | 96,600     | 9,997   | 67,400     | 7,107   | 7,150      | 804     | 8,225     | 1,444   |
| Spots.....                | 2,300      | 43      | 3,000      | 96      | 2,400      | 93      | 2,800     | 112     |
| Squeteague, fresh.....    | 5,499,919  | 97,653  | 6,279,603  | 118,845 | 864,215    | 16,399  | 523,600   | 11,068  |
| Squeteague, salted.....   |            |         |            |         | 200        | 10      | 100       | 5       |
| Striped bass.....         | 4,300      | 451     | 7,800      | 663     | 52,215     | 8,375   | 54,395    | 8,731   |
| Sturgeon.....             | 19,358     | 936     | 22,473     | 1,163   | 4,150      | 221     | 2,600     | 150     |
| Suckers.....              | 1,000      | 30      | 3,000      | 115     | 1,300      | 30      | 8,200     | 491     |
| Tautog.....               | 287,700    | 5,457   | 313,548    | 5,980   | 600        | 12      | 100       | 5       |
| Tomcod or frost-fish..... | 1,650      | 14      | 1,950      | 15      |            |         |           |         |
| Whiting.....              | 4,000      | 50      | 3,100      | 47      |            |         |           |         |
| Caviar.....               | 600        | 300     | 1,373      | 575     |            |         | 1,045     | 570     |
| Crabs, hard.....          | 188,467    | 4,634   | 388,090    | 9,511   | 136,367    | 3,459   | 40,399    | 700     |
| Crabs, soft.....          | 180,000    | 17,075  | 196,000    | 17,950  | 74,213     | 7,808   | 67,078    | 7,080   |
| Lobsters.....             | 63,600     | 6,004   | 79,500     | 7,615   | 4,430      | 379     | 3,126     | 142     |
| Shrimp.....               |            |         |            |         | 2,296      | 1,365   | 2,085     | 1,265   |
| Oysters, market.....      | 1,319,409  | 186,090 | 1,034,873  | 147,064 | 1,612,079  | 214,822 | 1,065,316 | 139,052 |
| Oysters, seed.....        |            |         | 2,800      | 160     | 236,915    | 9,769   | 256,340   | 10,301  |
| Clams, hard.....          | 2,142,888  | 290,654 | 2,068,368  | 282,348 | 875,844    | 88,441  | 858,312   | 86,654  |
| Clams, soft.....          | 703,000    | 61,625  | 755,000    | 64,345  | 42,000     | 2,100   | 40,000    | 2,000   |
| Scallops.....             | 66,600     | 3,700   | 50,400     | 2,800   |            |         |           |         |
| Mussels.....              |            |         | 5,000      | 250     |            |         |           |         |
| Terrapin.....             |            |         |            |         | 2,381      | 1,341   |           |         |
| Turtles.....              |            |         |            |         | 3,350      | 278     | 3,350     | 278     |
| Total.....                | 40,790,650 | 977,683 | 36,469,684 | 971,418 | 10,304,458 | 424,194 | 7,612,622 | 350,681 |

Table showing the yield of the fisheries of New Jersey in 1897 and 1898—Cont'd.

| Species.               | Salem.    |         |           |         | Sussex. |        |       |        |
|------------------------|-----------|---------|-----------|---------|---------|--------|-------|--------|
|                        | 1897.     |         | 1898.     |         | 1897.   |        | 1898. |        |
|                        | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.    | Value. | Lbs.  | Value. |
| Alewives.....          | 53,000    | \$253   | 60,000    | \$400   |         |        |       |        |
| Carp.....              | 391,100   | 19,555  | 95,400    | 5,682   |         |        |       |        |
| Cat-fish.....          | 34,871    | 1,743   | 38,379    | 1,919   |         |        |       |        |
| Perch, white.....      | 1,725     | 69      | 2,020     | 80      |         |        |       |        |
| Perch, yellow.....     | 1,000     | 40      | 800       | 32      |         |        |       |        |
| Salmon.....            | 117       | 53      |           |         |         |        |       |        |
| Shad.....              | 6,436,400 | 148,050 | 6,839,550 | 133,394 | 8,800   | \$660  | 6,800 | \$510  |
| Squeteague, fresh..... | 27,900    | 1,563   | 27,500    | 1,547   |         |        |       |        |
| Striped bass.....      | 24,150    | 2,415   | 23,450    | 2,345   |         |        |       |        |
| Sturgeon.....          | 495,806   | 16,568  | 353,858   | 13,641  |         |        |       |        |
| Suckers.....           | 13,045    | 522     | 15,019    | 601     |         |        |       |        |
| Caviar.....            | 122,715   | 40,905  | 94,196    | 48,862  |         |        |       |        |
| Oysters, market.....   |           |         | 2,912     | 500     |         |        |       |        |
| Turtle.....            | 6,000     | 360     | 5,200     | 312     |         |        |       |        |
| Total.....             | 7,607,829 | 232,096 | 7,558,284 | 209,315 | 8,800   | 660    | 6,800 | 510    |

| Species.           | Union.  |          |         |          | Warren. |        |        |        |
|--------------------|---------|----------|---------|----------|---------|--------|--------|--------|
|                    | 1897.   |          | 1898.   |          | 1897.   |        | 1898.  |        |
|                    | Lbs.    | Value.   | Lbs.    | Value.   | Lbs.    | Value. | Lbs.   | Value. |
| Eels.....          |         |          |         |          | 5,066   | \$432  | 4,666  | \$384  |
| Salmon.....        |         |          |         |          |         |        | 31     | 6      |
| Shad.....          |         |          |         |          | 54,000  | 3,867  | 50,120 | 3,526  |
| Suckers.....       |         |          |         |          | 15,030  | 901    | 14,885 | 893    |
| Oysters, seed..... | 192,500 | \$11,000 | 525,000 | \$30,000 |         |        |        |        |
| Total.....         | 192,500 | 11,000   | 525,000 | 30,000   | 74,096  | 5,200  | 69,702 | 4,809  |

The shad fishery of New Jersey exceeds in value that of any other species of fish proper taken in the State. About 89 per cent of the catch is from the Delaware River, a little over 9 per cent from the Hudson River, and less than 2 per cent from other waters. Nearly half of the catch is credited to Salem County. An interesting feature in connection with this fishery on the Delaware River is the recent introduction of naphtha motors for propelling shad gill-net boats. At Bridgeport, N. J., one boat used naphtha in 1898, and four in 1899.

Table showing the number of shad taken in each county of New Jersey in 1897 and 1898.

| Counties.       | 1897.      |         | 1898.      |         |
|-----------------|------------|---------|------------|---------|
|                 | No.        | Value.  | No.        | Value.  |
| Atlantic.....   | 250        | \$74    | 50         | \$15    |
| Bergen.....     | 115,200    | 17,934  | 129,855    | 18,510  |
| Burlington..... | 283,492    | 29,762  | 224,347    | 21,514  |
| Camden.....     | 351,863    | 33,434  | 237,010    | 17,328  |
| Cape May.....   | 970        | 174     | 870        | 154     |
| Cumberland..... | 119,846    | 17,509  | 135,150    | 17,150  |
| Gloucester..... | 314,740    | 33,189  | 342,600    | 30,418  |
| Hudson.....     | 183,700    | 26,225  | 172,625    | 22,843  |
| Hunterdon.....  | 27,100     | 6,349   | 19,404     | 4,590   |
| Mercer.....     | 67,625     | 12,131  | 51,800     | 12,630  |
| Middlesex.....  | 2,469      | 624     | 3,038      | 623     |
| Monmouth.....   | 33,325     | 8,996   | 25,419     | 6,428   |
| Ocean.....      | 17,850     | 3,953   | 16,475     | 3,540   |
| Salem.....      | 1,294,800  | 148,050 | 1,376,850  | 133,394 |
| Sussex.....     | 2,200      | 660     | 1,700      | 510     |
| Warren.....     | 13,500     | 3,867   | 12,530     | 3,526   |
| Total.....      | 12,828,930 | 342,931 | 12,749,723 | 293,173 |

113,000,783 pounds.

12,844,432 pounds.



## THE PRODUCTS BY APPARATUS.

The products of the vessel fisheries of New Jersey in 1897 were valued at \$1,167,553, and those of the shore fisheries at \$2,446,881. In 1898 the vessel fisheries yielded \$1,192,723, and the shore fisheries \$2,371,043. The more important forms of apparatus are used on both vessels and boats, but pound nets, weirs, and a variety of smaller apparatus are employed exclusively in the shore fisheries.

Seines are used on vessels chiefly for capturing menhaden, and occasionally for other species. In shore fisheries they are more widely distributed than any other apparatus, taking principally alewives, carp, cat-fish, eels, flounders, menhaden, white perch, shad, squeteague, striped bass, suckers, and soft crabs. The catch taken with them by vessels and boats in 1897 aggregated 31,398,546 pounds, valued at \$235,745, and in 1898, 23,403,012 pounds, valued at \$193,457.

Gill nets were used extensively in the shore fisheries, but on vessels to a limited extent only, in Monmouth and Ocean counties. They are especially important in the capture of shad and sturgeon. In 1897 they took 11,161,755 pounds of shad, valued at \$277,529, and 989,096 pounds of sturgeon, including caviar, valued at \$92,682; and in 1898, 11,447,220 pounds of shad, valued at \$248,867, and 847,740 pounds of sturgeon products, valued at \$99,720. In addition to this there were large quantities of other species taken, the more important being blue-fish, white perch, and squeteague. The yield of the gill-net fisheries in 1897 was 12,875,038 pounds, valued at \$400,459, and in 1898 12,980,292 pounds, valued at \$378,997.

Pound nets are employed to a greater or less extent in five counties, but principally in Monmouth and Cape May. The more important localities in Monmouth County in which they are used are Keansburg, Port Monmouth and vicinity, and along the ocean shore from Sandy Hook to Manasquan. The remaining pound nets on the eastern side of the State are in Middlesex, Ocean, Atlantic, and Cape May counties. In Cape May County a large number of small pound nets are set in various localities on the Delaware Bay shore for fish and king crabs, and a considerable number of weirs are fished exclusively for king crabs. In 1897 the catch of all species in pound nets and weirs was 16,013,724 pounds, valued at \$214,068; and in 1898 14,070,839 pounds, valued at \$216,455. The species taken in greatest abundance were blue-fish, bonito, butter-fish, cod, croakers, flounders, menhaden, scup, sea bass, shad, Spanish mackerel, squeteague, tautog, and king crabs. Squeteague was the most important species, and comprised about one-half the quantity and value of the entire catch. Cod were also abundant, especially as compared with former years.

Fyke nets and stop nets are used to a limited extent in the vessel and shore fisheries, the value of the catch by fyke nets in 1897 being \$38,929 and in 1898 \$36,412; and by stop nets \$20,617 and \$7,471 for each year, respectively. Stop nets are set at high tide across the

entrance of creeks and at other convenient places to prevent fish (chiefly carp) from escaping when the tide recedes.

The products of the hand, trawl, and trot line fisheries by vessels and boats in 1897 aggregated 11,604,721 pounds, valued at \$335,715, and in 1898, 12,263,640 pounds, valued at \$395,781; the most important species being blue-fish, cod, sea bass, and squeteague.

The group of apparatus yielding the largest returns, in both the vessel and shore fisheries, included oyster tongs and dredges, crab dredges, clam tongs, rakes, and hoes. The products of these in 1897 were valued at \$2,303,383. The most important items in this value were oysters and clams, the former being valued at \$1,682,015 and the latter at \$607,520. The catch by these forms of apparatus in 1898 was worth \$2,274,594, the value of the oyster fishery being \$1,669,324, and of the clam fishery \$590,684. Other products secured in considerable quantities each year were hard crabs, scallops and mussels.

Pots for lobsters and eels were operated to a limited extent, the catch being worth \$22,978 in 1897, and \$27,166 in 1898.

The products taken with minor forms of apparatus employed in the shore fisheries were worth \$42,540 in 1897, and \$33,433 in 1898.

The following tables show the quantity and value of the products by counties and apparatus for the years 1897 and 1898:

*Table showing, by counties, the yield of the seine fisheries of New Jersey in 1897 and 1898.*

| Species.                 | Atlantic.        |               |                  |               | Burlington.      |               |                |               |
|--------------------------|------------------|---------------|------------------|---------------|------------------|---------------|----------------|---------------|
|                          | 1897.            |               | 1898.            |               | 1897.            |               | 1898.          |               |
|                          | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.           | Value.        |
| <b>Vessel fisheries:</b> |                  |               |                  |               |                  |               |                |               |
| Menhaden.....            | 5,225,625        | \$10,887      | 3,104,130        | \$6,467       |                  |               |                |               |
| Perch, white.....        | 665              | 65            | 500              | 50            | 1,530            | \$111         | 645            | \$49          |
| Squeteague.....          |                  |               |                  |               | 3,000            | 150           | 3,000          | 150           |
| Striped bass.....        | 5,350            | 960           | 4,000            | 720           | 320              | 54            | 130            | 27            |
| <b>Total.....</b>        | <b>5,231,640</b> | <b>11,912</b> | <b>3,108,630</b> | <b>7,237</b>  | <b>4,850</b>     | <b>315</b>    | <b>3,775</b>   | <b>226</b>    |
| <b>Shore fisheries:</b>  |                  |               |                  |               |                  |               |                |               |
| Alewives.....            | 14,200           | 65            | 29,880           | 107           | 520,500          | 1,785         | 78,000         | 315           |
| Blue-fish.....           | 4,250            | 210           | 4,150            | 205           |                  |               |                |               |
| Carp.....                |                  |               |                  |               | 74,900           | 3,956         | 27,050         | 1,431         |
| Cat-fish.....            |                  |               |                  |               | 26,565           | 1,231         | 25,669         | 1,184         |
| Drum.....                | 1,000            | 10            | 1,000            | 10            |                  |               |                |               |
| Eels.....                | 38,999           | 1,899         | 45,600           | 2,149         |                  |               |                |               |
| Flounders.....           | 74,010           | 2,119         | 68,500           | 1,852         | 300              | 15            | 200            | 10            |
| King-fish.....           | 2,230            | 147           | 2,300            | 146           |                  |               |                |               |
| Mullet, fresh.....       | 1,600            | 88            | 1,300            | 73            |                  |               |                |               |
| Mullet, salted.....      | 800              | 40            | 500              | 25            |                  |               |                |               |
| Perch, white.....        | 85,800           | 6,263         | 66,150           | 4,849         | 36,375           | 2,200         | 27,550         | 1,565         |
| Perch, yellow.....       |                  |               |                  |               | 2,060            | 106           | 1,500          | 78            |
| Pike and pickerel.....   | 75               | 6             | 50               | 4             | 500              | 30            | 375            | 23            |
| Salmon.....              |                  |               |                  |               | 37               | 8             | 8              | 4             |
| Scup.....                | 100              | 2             | 100              | 2             |                  |               |                |               |
| Sea bass.....            | 700              | 14            | 700              | 14            |                  |               |                |               |
| Shad.....                | 100              | 10            | 100              | 10            | 406,600          | 10,900        | 323,898        | 7,658         |
| Sheepshead.....          | 9,000            | 1,670         | 6,000            | 1,080         |                  |               |                |               |
| Spots.....               | 1,300            | 18            | 1,300            | 18            |                  |               |                |               |
| Squeteague.....          | 349,200          | 10,937        | 374,500          | 11,705        | 3,000            | 150           | 3,000          | 150           |
| Striped bass.....        | 27,435           | 3,169         | 17,715           | 2,086         | 12,373           | 1,489         | 11,562         | 1,310         |
| Sturgeon.....            |                  |               |                  |               | 300              | 8             | 450            | 20            |
| Suckers.....             | 200              | 5             | 200              | 5             | 44,431           | 2,173         | 45,952         | 2,173         |
| Terrapin.....            | 1,103            | 626           |                  |               |                  |               |                |               |
| <b>Total.....</b>        | <b>612,102</b>   | <b>27,298</b> | <b>620,045</b>   | <b>24,340</b> | <b>1,127,941</b> | <b>24,051</b> | <b>545,214</b> | <b>15,921</b> |
| <b>Grand total ..</b>    | <b>5,843,742</b> | <b>39,210</b> | <b>3,728,675</b> | <b>31,577</b> | <b>1,132,791</b> | <b>24,366</b> | <b>548,989</b> | <b>16,147</b> |

Table showing the yield of the seine fisheries of New Jersey, etc.—Continued.

| Species.                           | Camden.   |         |         |        | Cape May. |        |         |        |
|------------------------------------|-----------|---------|---------|--------|-----------|--------|---------|--------|
|                                    | 1897.     |         | 1896.   |        | 1897.     |        | 1896.   |        |
|                                    | Lbs.      | Value.  | Lbs.    | Value. | Lbs.      | Value. | Lbs.    | Value. |
| <b>Vessel fisheries:</b>           |           |         |         |        |           |        |         |        |
| Alewives.....                      |           |         |         |        | 7,000     | \$70   | 4,000   | \$40   |
| Blue-fish.....                     |           |         |         |        | 500       | 15     |         |        |
| Carp.....                          |           |         |         |        | 2,300     | 69     | 914     | 27     |
| Cat-fish.....                      |           |         |         |        | 380       | 22     | 515     | 31     |
| Croakers.....                      |           |         |         |        | 1,500     | 30     |         |        |
| Flounders.....                     |           |         |         |        | 500       | 15     |         |        |
| Perch, white.....                  |           |         |         |        | 1,500     | 75     | 1,800   | 90     |
| Scup.....                          |           |         |         |        | 1,000     | 30     |         |        |
| Sea bass.....                      |           |         |         |        | 2,000     | 60     |         |        |
| Squeteague.....                    |           |         |         |        | 4,700     | 158    | 2,000   | 80     |
| Striped bass.....                  |           |         |         |        | 1,743     | 122    | 1,305   | 91     |
| Suckers.....                       |           |         |         |        | 500       | 15     | 600     | 18     |
| <b>Total.....</b>                  |           |         |         |        | 23,623    | 681    | 11,134  | 377    |
| <b>Shore fisheries:</b>            |           |         |         |        |           |        |         |        |
| Alewives.....                      | 490,200   | \$1,602 | 202,250 | \$823  | 61,500    | 1,222  | 61,850  | 1,312  |
| Blue-fish.....                     |           |         |         |        | 1,600     | 80     | 2,150   | 108    |
| Butter-fish.....                   |           |         |         |        | 3,300     | 150    | 3,250   | 150    |
| Carp.....                          | 38,913    | 2,303   | 12,300  | 730    |           |        |         |        |
| Cat-fish.....                      | 18,664    | 933     | 17,391  | 869    |           |        |         |        |
| Drum.....                          |           |         |         |        | 725       | 8      | 600     | 6      |
| Eels.....                          |           |         |         |        | 48,933    | 2,358  | 37,466  | 1,843  |
| Flounders.....                     |           |         |         |        | 19,150    | 696    | 18,475  | 693    |
| King-fish.....                     |           |         |         |        | 3,700     | 224    | 3,545   | 223    |
| Mullet, fresh.....                 |           |         |         |        | 19,325    | 398    | 21,600  | 452    |
| Perch, white.....                  | 1,500     | 67      | 1,223   | 53     | 18,695    | 1,492  | 18,910  | 1,501  |
| Perch, yellow.....                 | 1,125     | 58      | 780     | 40     | 650       | 39     | 570     | 34     |
| Salmon.....                        | 746       | 237     |         |        |           |        |         |        |
| Sea bass.....                      |           |         |         |        |           |        | 285     | 10     |
| Shad.....                          | 532,200   | 15,988  | 256,080 | 5,196  |           |        |         |        |
| Spots.....                         |           |         |         |        | 4,500     | 210    | 5,000   | 240    |
| Squeteague.....                    |           |         |         |        | 220,250   | 7,177  | 202,650 | 6,824  |
| Striped bass.....                  | 6,900     | 690     | 1,300   | 130    | 24,180    | 2,512  | 25,058  | 1,495  |
| Sturgeon.....                      | 1,000     | 25      | 450     | 12     |           |        |         |        |
| Suckers.....                       | 11,330    | 591     | 9,426   | 495    |           |        |         |        |
| <b>Total.....</b>                  | 1,102,578 | 22,494  | 501,200 | 8,348  | 426,506   | 16,566 | 401,409 | 14,886 |
| <b>Total vessel and shore.....</b> | 1,102,578 | 22,494  | 501,200 | 8,348  | 450,131   | 17,247 | 412,543 | 15,263 |

| Species.                           | Cumberland. |        |         |        | Gloucester. |        |         |        |
|------------------------------------|-------------|--------|---------|--------|-------------|--------|---------|--------|
|                                    | 1897.       |        | 1896.   |        | 1897.       |        | 1896.   |        |
|                                    | Lbs.        | Value. | Lbs.    | Value. | Lbs.        | Value. | Lbs.    | Value. |
| <b>Vessel fisheries:</b>           |             |        |         |        |             |        |         |        |
| Carp.....                          |             |        |         |        | 2,900       | \$125  | 1,400   | \$84   |
| Cat-fish.....                      |             |        |         |        | 1,845       | 92     | 2,000   | 100    |
| Perch, white.....                  |             |        |         |        | 145         | 7      | 100     | 5      |
| Perch, yellow.....                 |             |        |         |        | 300         | 15     | 250     | 12     |
| Suckers.....                       |             |        |         |        | 1,600       | 80     | 2,200   | 110    |
| <b>Total.....</b>                  |             |        |         |        | 6,790       | 319    | 5,950   | 311    |
| <b>Shore fisheries:</b>            |             |        |         |        |             |        |         |        |
| Alewives.....                      | 45,500      | \$265  | 61,500  | \$315  | 54,390      | 227    | 55,255  | 232    |
| Carp.....                          | 25,565      | 767    | 10,440  | 313    | 31,026      | 1,571  | 9,100   | 546    |
| Cat-fish.....                      | 18,054      | 973    | 21,225  | 1,135  | 9,396       | 474    | 11,660  | 596    |
| Perch, white.....                  | 12,692      | 609    | 12,832  | 611    | 239         | 13     | 475     | 20     |
| Perch, yellow.....                 |             |        |         |        | 625         | 31     | 660     | 33     |
| Salmon.....                        |             |        |         |        | 24          | 12     |         |        |
| Shad.....                          | 7,800       | 430    | 10,500  | 575    | 158,920     | 4,809  | 214,450 | 4,970  |
| Squeteague.....                    | 44,530      | 1,966  | 42,840  | 1,718  |             |        |         |        |
| Striped bass.....                  | 49,766      | 3,545  | 49,003  | 3,500  | 800         | 80     | 1,200   | 120    |
| Sturgeon.....                      | 1,050       | 15     | 700     | 10     |             |        |         |        |
| Suckers.....                       | 5,840       | 210    | 5,043   | 185    | 5,434       | 242    | 6,131   | 276    |
| <b>Total.....</b>                  | 210,797     | 8,780  | 214,083 | 8,362  | 260,904     | 7,459  | 298,931 | 6,793  |
| <b>Total vessel and shore.....</b> | 210,797     | 8,780  | 214,083 | 8,362  | 267,694     | 7,778  | 304,881 | 7,194  |

Table showing the yield of the seine fisheries of New Jersey, etc.—Continued.

| Species.                      | Middlesex. |        |         |        | Monmouth.  |          |            |        |
|-------------------------------|------------|--------|---------|--------|------------|----------|------------|--------|
|                               | 1897.      |        | 1898.   |        | 1897.      |          | 1898.      |        |
|                               | Lbs.       | Value. | Lbs.    | Value. | Lbs.       | Value.   | Lbs.       | Value. |
| <b>Vessel fisheries:</b>      |            |        |         |        |            |          |            |        |
| Flounders                     |            |        |         |        |            |          | 450        | \$12   |
| Menhaden                      |            |        |         |        | 15,120,000 | \$37,950 | 12,720,000 | 34,226 |
| Squeteague                    |            |        |         |        |            |          | 400        | 8      |
| Striped bass                  |            |        |         |        |            |          | 4,000      | 280    |
| <b>Total</b>                  |            |        |         |        | 15,120,000 | 37,950   | 12,724,850 | 34,526 |
| <b>Shore fisheries:</b>       |            |        |         |        |            |          |            |        |
| Alewives                      | 48,000     | \$80   | 6,000   | \$12   | 8,112      | 66       | 10,112     | 81     |
| Blue-fish                     | 10,300     | 340    | 10,800  | 348    | 1,800      | 80       | 6,000      | 250    |
| Bonito                        |            |        |         |        | 200        | 8        | 100        | 4      |
| Eels                          | 2,666      | 160    | 666     | 40     | 5,000      | 200      | 15,666     | 700    |
| Flounders                     | 1,000      | 60     | 1,200   | 72     | 2,500      | 65       | 2,500      | 80     |
| Menhaden                      | 444,400    | 707    | 658,400 | 1,113  | 640,000    | 1,000    | 240,000    | 375    |
| Perch, white                  | 100        | 10     | 100     | 10     | 2,000      | 110      | 1,600      | 88     |
| Shad                          | 3,476      | 174    | 7,152   | 278    | 3,400      | 200      | 2,800      | 160    |
| Squeteague                    | 13,500     | 375    | 16,000  | 700    | 25,500     | 520      | 29,250     | 545    |
| Striped bass                  | 300        | 26     | 800     | 78     | 500        | 46       | 1,000      | 84     |
| Suckers                       |            |        |         |        | 1,000      | 30       | 3,000      | 115    |
| Crabs, soft                   |            |        |         |        | 12,000     | 900      | 18,000     | 1,350  |
| <b>Total</b>                  | 523,742    | 1,932  | 701,118 | 2,651  | 702,012    | 3,225    | 330,028    | 3,832  |
| <b>Total vessel and shore</b> | 523,742    | 1,932  | 701,118 | 2,651  | 15,822,012 | 41,175   | 13,054,878 | 38,358 |

| Species.                      | Ocean.    |         |           |         | Salem.  |        |         |        |
|-------------------------------|-----------|---------|-----------|---------|---------|--------|---------|--------|
|                               | 1897.     |         | 1898.     |         | 1897.   |        | 1898.   |        |
|                               | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.    | Value. | Lbs.    | Value. |
| <b>Vessel fisheries:</b>      |           |         |           |         |         |        |         |        |
| Menhaden                      | 4,200,000 | \$7,000 | 1,920,000 | \$2,400 |         |        |         |        |
| <b>Shore fisheries:</b>       |           |         |           |         |         |        |         |        |
| Alewives                      | 697,500   | 3,130   | 980,300   | 4,280   | 53,000  | \$253  | 60,000  | \$400  |
| Blue-fish                     | 4,100     | 160     | 1,100     | 40      |         |        |         |        |
| Carp                          |           |         |           |         | 129,100 | 6,455  | 38,100  | 2,286  |
| Cat-fish                      | 500       | 45      | 1,000     | 75      | 27,261  | 1,362  | 32,914  | 1,646  |
| Cod                           | 50        | 2       | 40        | 2       |         |        |         |        |
| Eels                          |           |         | 2,666     | 120     |         |        |         |        |
| Flounders                     | 4,000     | 106     | 3,000     | 162     |         |        |         |        |
| Kingfish                      | 20        | 5       | 40        | 10      |         |        |         |        |
| Menhaden                      | 12,000    | 100     | 13,500    | 105     |         |        |         |        |
| Mullet, fresh                 |           |         | 1,000     | 30      |         |        |         |        |
| Perch, white                  | 265,275   | 15,107  | 317,240   | 17,713  | 1,525   | 61     | 1,720   | 68     |
| Perch, yellow                 |           |         |           |         | 1,000   | 40     | 800     | 32     |
| Pike and pickerel             | 300       | 24      | 300       | 24      |         |        |         |        |
| Scup                          | 2,700     | 72      | 200       | 2       |         |        |         |        |
| Sea bass                      | 100       | 5       | 100       | 5       |         |        |         |        |
| Shad                          | 1,400     | 95      | 1,400     | 95      | 66,900  | 2,175  | 80,550  | 2,299  |
| Sheepshead                    | 150       | 23      |           |         |         |        |         |        |
| Spots                         | 2,300     | 92      | 2,300     | 92      |         |        |         |        |
| Squeteague                    | 98,615    | 2,441   | 57,450    | 1,204   |         |        |         |        |
| Striped bass                  | 46,760    | 7,644   | 49,950    | 8,126   | 24,100  | 2,410  | 23,300  | 2,330  |
| Suckers                       | 100       | 6       | 8,200     | 491     | 13,045  | 522    | 15,019  | 601    |
| Tautog                        | 100       | 5       | 100       | 5       |         |        |         |        |
| Crabs, hard                   | 3,400     | 102     | 3,333     | 100     |         |        |         |        |
| Crabs, soft                   | 40,757    | 4,134   | 45,901    | 4,695   |         |        |         |        |
| Terrapin                      | 184       | 110     |           |         |         |        |         |        |
| <b>Total</b>                  | 1,180,311 | 33,408  | 1,489,120 | 37,376  | 315,931 | 13,278 | 252,403 | 9,662  |
| <b>Total vessel and shore</b> | 5,380,311 | 40,408  | 3,409,120 | 39,776  | 315,931 | 13,278 | 252,403 | 9,662  |

| Species.                | Sussex. |        |       |        | Warren. |         |        |        |
|-------------------------|---------|--------|-------|--------|---------|---------|--------|--------|
|                         | 1897.   |        | 1898. |        | 1897.   |         | 1898.  |        |
|                         | Lbs.    | Value. | Lbs.  | Value. | Lbs.    | Value.  | Lbs.   | Value. |
| <b>Shore fisheries:</b> |         |        |       |        |         |         |        |        |
| Scup                    |         |        |       |        |         |         | 31     | \$6    |
| Sheepshead              | 8,800   | \$660  | 6,800 | \$510  | 54,000  | \$3,867 | 50,120 | 3,526  |
| Tautog                  |         |        |       |        | 15,030  | 901     | 14,885 | 893    |
| <b>Total</b>            | 8,800   | 660    | 6,800 | 510    | 69,030  | 4,768   | 65,036 | 4,425  |

Table showing the yield of the seine fisheries of New Jersey, etc.—Continued.

| Species.           | Hunterdon. |        |        |        | Mercer. |        |         |        |
|--------------------|------------|--------|--------|--------|---------|--------|---------|--------|
|                    | 1897.      |        | 1898.  |        | 1897.   |        | 1898.   |        |
|                    | Lbs.       | Value. | Lbs.   | Value. | Lbs.    | Value. | Lbs.    | Value. |
| Shore fisheries:   |            |        |        |        |         |        |         |        |
| Alewives.....      |            |        |        |        | 7,500   | \$55   | 6,000   | \$45   |
| Carp.....          | 1,350      | \$25   | 1,088  | \$20   | 3,810   | 200    | 2,718   | 138    |
| Cat-fish.....      | 150        | 6      | 210    | 8      | 7,715   | 389    | 8,232   | 463    |
| Perch, white.....  |            |        |        |        | 800     | 32     | 600     | 24     |
| Perch, yellow..... |            |        |        |        | 200     | 8      | 250     | 10     |
| Salmon.....        | 151        | 20     |        |        | 36      | 9      | 7       | 1      |
| Shad.....          | 108,400    | 6,349  | 77,616 | 4,590  | 106,100 | 4,713  | 70,040  | 4,030  |
| Striped bass.....  | 395        | 40     | 455    | 46     | 3,460   | 333    | 4,455   | 402    |
| Sturgeon.....      |            |        |        |        |         |        | 60      | 4      |
| Suckers.....       | 8,800      | 397    | 8,050  | 364    | 22,120  | 1,073  | 23,505  | 1,129  |
| Total.....         | 119,246    | 6,837  | 87,419 | 5,028  | 151,741 | 6,812  | 115,867 | 6,246  |

## SUMMARY.

| Species.                    | 1897.      |         | 1898.      |         |
|-----------------------------|------------|---------|------------|---------|
|                             | Lbs.       | Value.  | Lbs.       | Value.  |
| Vessel fisheries:           |            |         |            |         |
| Alewives.....               | 7,000      | \$70    | 4,000      | \$40    |
| Blue-fish.....              | 500        | 15      |            |         |
| Carp.....                   | 5,200      | 194     | 2,314      | 111     |
| Cat-fish.....               | 2,225      | 114     | 2,515      | 131     |
| Croakers.....               | 1,500      | 30      |            |         |
| Flounders.....              | 500        | 15      | 450        | 12      |
| Menhaden.....               | 24,545,625 | 55,837  | 17,744,130 | 43,093  |
| Perch, white.....           | 3,840      | 258     | 3,045      | 194     |
| Perch, yellow.....          | 300        | 15      | 250        | 12      |
| Scup.....                   | 1,000      | 30      |            |         |
| Sea bass.....               | 2,000      | 60      |            |         |
| Squeteague.....             | 7,700      | 308     | 5,400      | 238     |
| Striped bass.....           | 7,413      | 1,136   | 9,435      | 1,118   |
| Suckers.....                | 2,100      | 95      | 2,800      | 128     |
| Total.....                  | 24,586,903 | 58,177  | 17,774,339 | 45,077  |
| Shore fisheries:            |            |         |            |         |
| Alewives.....               | 2,000,402  | 8,750   | 1,551,147  | 7,922   |
| Blue-fish.....              | 22,050     | 870     | 24,200     | 946     |
| Bonito.....                 | 200        | 8       | 100        | 4       |
| Butter-fish.....            | 3,300      | 150     | 3,250      | 150     |
| Carp.....                   | 304,664    | 15,277  | 100,796    | 5,464   |
| Cat-fish.....               | 108,305    | 5,413   | 118,301    | 5,976   |
| Cod.....                    | 50         | 2       | 40         | 2       |
| Drum.....                   | 1,725      | 18      | 1,600      | 16      |
| Eels.....                   | 95,598     | 4,617   | 102,064    | 4,852   |
| Flounders.....              | 100,960    | 3,061   | 93,875     | 2,869   |
| King-fish.....              | 5,950      | 376     | 5,885      | 379     |
| Menhaden.....               | 1,096,400  | 1,807   | 911,900    | 1,593   |
| Mullet, fresh.....          | 20,925     | 486     | 23,900     | 555     |
| Mullet, salted.....         | 800        | 40      | 500        | 25      |
| Perch, white.....           | 425,051    | 25,964  | 448,400    | 26,502  |
| Perch, yellow.....          | 5,660      | 282     | 4,560      | 227     |
| Pike and pickerel.....      | 875        | 60      | 725        | 51      |
| Salmon.....                 | 994        | 286     | 46         | 11      |
| Scup.....                   | 2,800      | 74      | 300        | 4       |
| Sea bass.....               | 800        | 19      | 1,085      | 29      |
| Shad.....                   | 1,458,096  | 50,370  | 1,101,506  | 33,897  |
| Sheepshead.....             | 9,150      | 1,693   | 6,000      | 1,080   |
| Spots.....                  | 8,100      | 320     | 8,600      | 350     |
| Squeteague.....             | 754,595    | 23,566  | 725,690    | 22,846  |
| Striped bass.....           | 196,969    | 21,984  | 185,798    | 19,707  |
| Sturgeon.....               | 2,350      | 48      | 1,660      | 46      |
| Suckers.....                | 127,330    | 6,150   | 139,411    | 6,727   |
| Tautog.....                 | 100        | 5       | 100        | 5       |
| Crabs, hard.....            | 3,400      | 102     | 3,333      | 100     |
| Crabs, soft.....            | 52,757     | 5,034   | 63,901     | 6,045   |
| Terrapin.....               | 1,287      | 736     |            |         |
| Total.....                  | 6,811,643  | 177,568 | 5,628,673  | 148,380 |
| Total vessel and shore..... | 31,398,546 | 235,745 | 23,403,012 | 193,457 |

Table showing, by counties, the yield of the gill-net fisheries of New Jersey in 1897 and 1898.

| Species.               | Atlantic. |        |        |        | Bergen. |          |         |          |
|------------------------|-----------|--------|--------|--------|---------|----------|---------|----------|
|                        | 1897.     |        | 1898.  |        | 1897.   |          | 1898.   |          |
|                        | Lbs.      | Value. | Lbs.   | Value. | Lbs.    | Value.   | Lbs.    | Value.   |
| Shore fisheries:       |           |        |        |        |         |          |         |          |
| Alewives.....          | 1,400     | \$13   | 2,900  | \$35   |         |          |         |          |
| Blue-fish.....         | 3,800     | 190    | 3,800  | 190    |         |          |         |          |
| Cat-fish.....          | 500       | 35     | 600    | 38     |         |          |         |          |
| Flounders.....         | 6,400     | 128    | 3,200  | 64     |         |          |         |          |
| King-fish.....         | 250       | 13     | 250    | 13     |         |          |         |          |
| Perch, white.....      | 36,350    | 2,933  | 28,750 | 2,401  |         |          |         |          |
| Pike and pickerel..... | 435       | 17     | 435    | 17     |         |          |         |          |
| Shad.....              | 750       | 55     |        |        | 460,800 | \$17,934 | 519,420 | \$18,510 |
| Spots.....             | 250       | 4      | 250    | 4      |         |          |         |          |
| Squeteague.....        | 20,300    | 438    | 20,400 | 456    |         |          |         |          |
| Striped bass.....      | 2,335     | 347    | 1,190  | 172    | 11,000  | 970      | 21,750  | 1,895    |
| Suckers.....           | 900       | 27     | 1,900  | 72     |         |          |         |          |
| Tautog.....            | 100       | 2      | 100    | 2      |         |          |         |          |
| Total.....             | 73,770    | 4,202  | 63,775 | 3,464  | 471,800 | 18,904   | 541,170 | 20,405   |

| Species.          | Burlington. |        |         |        | Camden. |        |         |          |
|-------------------|-------------|--------|---------|--------|---------|--------|---------|----------|
|                   | 1897.       |        | 1898.   |        | 1897.   |        | 1898.   |          |
|                   | Lbs.        | Value. | Lbs.    | Value. | Lbs.    | Value. | Lbs.    | Value.   |
| Shore fisheries:  |             |        |         |        |         |        |         |          |
| Perch, white..... | 1,000       | \$50   | 1,000   | \$50   |         |        |         |          |
| Salmon.....       | 11          | 4      | 23      | 8      |         |        |         |          |
| Shad.....         | 757,960     | 18,862 | 634,050 | 13,856 | 872,315 | 17,446 | 758,250 | \$12,132 |
| Squeteague.....   | 4,200       | 210    | 9,300   | 465    |         |        |         |          |
| Sturgeon.....     | 15,660      | 819    | 7,340   | 439    |         |        |         |          |
| Suckers.....      | 10,600      | 424    | 11,400  | 456    |         |        |         |          |
| Caviar.....       | 6,060       | 2,290  | 2,625   | 1,687  |         |        |         |          |
| Total.....        | 795,491     | 22,659 | 665,738 | 16,961 | 872,363 | 17,473 | 758,250 | 12,132   |

| Species.         | Gloucester. |        |           |        | Hudson. |          |         |          |
|------------------|-------------|--------|-----------|--------|---------|----------|---------|----------|
|                  | 1897.       |        | 1898.     |        | 1897.   |          | 1898.   |          |
|                  | Lbs.        | Value. | Lbs.      | Value. | Lbs.    | Value.   | Lbs.    | Value.   |
| Shore fisheries: |             |        |           |        |         |          |         |          |
| Carp.....        | 2,200       | \$110  | 1,800     | \$108  |         |          |         |          |
| Shad.....        | 1,310,000   | 28,380 | 1,357,000 | 25,448 | 448,800 | \$15,820 | 467,600 | \$15,938 |
| Total.....       | 1,312,200   | 28,490 | 1,358,800 | 25,556 | 448,800 | 15,820   | 467,600 | 15,938   |

| Species.                  | Middlesex. |        |       |        | Monmouth. |        |         |        |
|---------------------------|------------|--------|-------|--------|-----------|--------|---------|--------|
|                           | 1897.      |        | 1898. |        | 1897.     |        | 1898.   |        |
|                           | Lbs.       | Value. | Lbs.  | Value. | Lbs.      | Value. | Lbs.    | Value. |
| Vessel fisheries:         |            |        |       |        |           |        |         |        |
| Blue-fish.....            |            |        |       |        |           |        | 200     | \$10   |
| Butter-fish.....          |            |        |       |        |           |        | 400     | 32     |
| Cod.....                  |            |        |       |        |           |        | 250     | 10     |
| Croakers.....             |            |        |       |        |           |        | 5,000   | 50     |
| Shad.....                 |            |        |       |        | 9,500     | \$360  | 12,000  | 390    |
| Squeteague.....           |            |        |       |        |           |        | 6,000   | 120    |
| Total.....                |            |        |       |        | 9,500     | 360    | 23,850  | 612    |
| Shore fisheries:          |            |        |       |        |           |        |         |        |
| Blue-fish.....            |            |        |       |        | 119,700   | 3,660  | 70,000  | 2,190  |
| Bonito.....               |            |        |       |        | 1,100     | 33     | 1,100   | 33     |
| Croakers.....             |            |        |       |        | 3,000     | 60     | 2,800   | 56     |
| Flounders.....            |            |        |       |        | 800       | 16     | 700     | 14     |
| Shad.....                 | 1,200      | \$60   | 1,200 | \$60   | 71,600    | 4,440  | 45,600  | 2,863  |
| Spanish mackerel.....     |            |        |       |        | 11,000    | 1,350  | 6,000   | 750    |
| Squeteague.....           |            |        |       |        | 25,500    | 510    | 26,000  | 520    |
| Sturgeon.....             |            |        |       |        |           |        | 6,750   | 405    |
| Caviar.....               |            |        |       |        |           |        | 770     | 308    |
| Total.....                | 1,200      | 60     | 1,200 | 60     | 232,700   | 10,069 | 159,720 | 7,139  |
| Total vessel and shore... | 1,200      | 60     | 1,200 | 60     | 242,200   | 10,429 | 183,570 | 7,751  |



## 242 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the yield of the gill-net fisheries of New Jersey in 1897 and 1898—Continued.

| Species.*          | Cape May. |        |        |        | Cumberland. |        |           |        |
|--------------------|-----------|--------|--------|--------|-------------|--------|-----------|--------|
|                    | 1897.     |        | 1898.  |        | 1897.       |        | 1898.     |        |
|                    | Lbs.      | Value. | Lbs.   | Value. | Lbs.        | Value. | Lbs.      | Value. |
| Shore fisheries:   |           |        |        |        |             |        |           |        |
| Alewives .....     | 1,200     | \$24   | 1,200  | \$24   | 1,200       | \$12   | 2,100     | \$21   |
| Blue-fish .....    | 80        | 5      | 300    | 8      |             |        |           |        |
| Butter-fish .....  | 100       | 5      |        |        |             |        |           |        |
| Croakers .....     |           |        | 800    | 12     |             |        |           |        |
| Drum .....         | 10,000    | 100    | 10,000 | 100    |             |        |           |        |
| King-fish .....    |           |        | 50     | 2      |             |        |           |        |
| Perch, white ..... | 2,600     | 234    | 2,600  | 234    | 2,700       | 135    | 3,000     | 150    |
| Salmon .....       |           |        |        |        |             |        | 22        | 10     |
| Shad .....         |           |        |        |        | 585,430     | 17,079 | 657,800   | 16,575 |
| Squeteague .....   | 1,200     | 40     |        |        | 6,300       | 252    | 5,000     | 200    |
| Striped bass ..... |           |        |        |        | 9,950       | 793    | 11,100    | 844    |
| Sturgeon .....     | 31,750    | 1,587  | 15,210 | 696    | 242,875     | 6,225  | 314,383   | 5,078  |
| Caviar .....       | 7,020     | 2,844  | 2,340  | 1,482  | 63,760      | 21,253 | 47,723    | 26,517 |
| Total .....        | 53,950    | 4,839  | 32,500 | 2,558  | 912,215     | 45,749 | 1,041,123 | 49,395 |

| Species.           | Mercer. |        |         |         | Salem.    |         |           |         |
|--------------------|---------|--------|---------|---------|-----------|---------|-----------|---------|
|                    | 1897.   |        | 1898.   |         | 1897.     |         | 1898.     |         |
|                    | Lbs.    | Value. | Lbs.    | Value.  | Lbs.      | Value.  | Lbs.      | Value.  |
| Shore fisheries:   |         |        |         |         |           |         |           |         |
| Carp .....         |         |        |         |         | 5,900     | \$295   | 4,000     | \$240   |
| Salmon .....       | 11      | \$3    |         |         | 117       | 53      |           |         |
| Shad .....         | 205,500 | 7,418  | 172,000 | \$8,600 | 6,869,500 | 145,875 | 6,759,000 | 131,095 |
| Striped bass ..... |         |        |         |         | 50        | 5       | 150       | 15      |
| Sturgeon .....     |         |        |         |         | 495,806   | 16,568  | 353,858   | 13,641  |
| Caviar .....       |         |        |         |         | 122,715   | 40,905  | 94,196    | 48,862  |
| Total .....        | 205,511 | 7,421  | 172,000 | 8,600   | 6,994,088 | 203,701 | 7,211,204 | 193,853 |

| Species.                | Ocean.  |        |         |        | Total for State. |         |            |         |
|-------------------------|---------|--------|---------|--------|------------------|---------|------------|---------|
|                         | 1897.   |        | 1898.   |        | 1897.            |         | 1898.      |         |
|                         | Lbs.    | Value. | Lbs.    | Value. | Lbs.             | Value.  | Lbs.       | Value.  |
| Vessel fisheries:       |         |        |         |        |                  |         |            |         |
| Blue-fish .....         |         |        |         |        |                  |         | 200        | \$10    |
| Butter-fish .....       |         |        |         |        |                  |         | 400        | 32      |
| Cod .....               |         |        |         |        |                  |         | 250        | 10      |
| Croakers .....          |         |        |         |        |                  |         | 5,000      | 50      |
| Shad .....              | 8,000   | \$350  | 8,000   | \$350  | 17,500           | \$710   | 20,000     | 740     |
| Squeteague .....        |         |        |         |        |                  |         | 6,000      | 120     |
| Sturgeon .....          | 3,400   | 188    | 1,600   | 80     | 3,400            | 188     | 1,600      | 80      |
| Caviar .....            |         |        | 945     | 525    |                  |         | 945        | 525     |
| Total .....             | 11,400  | 538    | 10,545  | 955    | 20,900           | 898     | 34,395     | 1,567   |
| Shore fisheries:        |         |        |         |        |                  |         |            |         |
| Alewives .....          | 15,600  | 120    | 30,600  | 305    | 19,400           | 169     | 36,800     | 385     |
| Blue-fish .....         | 189,320 | 9,022  | 168,165 | 8,523  | 312,900          | 12,877  | 242,265    | 10,911  |
| Bonito .....            | 2,200   | 54     | 500     | 19     | 3,300            | 87      | 1,600      | 52      |
| Butter-fish .....       | 500     | 15     | 700     | 19     | 600              | 20      | 700        | 19      |
| Carp .....              |         |        |         |        | 8,100            | 405     | 5,800      | 348     |
| Cat-fish .....          |         |        |         |        | 500              | 35      | 600        | 38      |
| Cod .....               | 2,500   | 38     | 100     | 2      | 2,500            | 38      | 100        | 2       |
| Croakers .....          | 5,700   | 114    | 4,340   | 84     | 8,700            | 174     | 7,940      | 152     |
| Drum .....              |         |        |         |        | 10,000           | 100     | 10,000     | 100     |
| Flounders .....         | 200     | 10     | 500     | 13     | 7,400            | 154     | 4,400      | 91      |
| King-fish .....         | 85      | 13     | 85      | 13     | 335              | 26      | 385        | 23      |
| Menhaden .....          |         |        | 4,000   | 25     |                  |         | 4,000      | 25      |
| Perch, white .....      | 36,825  | 2,973  | 62,347  | 4,983  | 79,475           | 6,325   | 97,697     | 7,818   |
| Pike and pickerel ..... | 1,460   | 75     | 1,400   | 82     | 1,895            | 92      | 1,835      | 99      |
| Salmon .....            |         |        |         |        | 187              | 87      | 45         | 13      |
| Scup .....              |         |        | 300     | 9      |                  |         | 300        | 9       |
| Sea bass .....          | 5,000   | 87     | 2,500   | 87     | 5,000            | 87      | 2,500      | 87      |
| Shad .....              | 60,400  | 3,450  | 55,300  | 3,050  | 11,144,255       | 276,819 | 11,427,220 | 248,127 |
| Spanish mackerel .....  | 1,650   | 254    | 5,225   | 694    | 12,650           | 1,604   | 11,225     | 1,444   |
| Spots .....             |         |        |         |        | 250              | 4       | 250        | 4       |
| Squeteague .....        | 155,800 | 3,691  | 135,450 | 3,251  | 213,300          | 5,141   | 196,150    | 4,892   |
| Striped bass .....      | 1,560   | 231    | 1,300   | 210    | 24,895           | 2,346   | 35,490     | 3,136   |
| Sturgeon .....          | 50      | 3      |         |        | 786,141          | 25,202  | 697,541    | 20,259  |
| Suckers .....           | 1,200   | 24     |         |        | 12,700           | 475     | 13,300     | 528     |
| Tautog .....            |         |        |         |        | 100              | 2       | 100        | 2       |
| Caviar .....            |         |        |         |        | 199,555          | 67,292  | 147,654    | 78,856  |
| Total .....             | 480,050 | 20,174 | 472,812 | 21,369 | 12,854,138       | 399,561 | 12,945,897 | 377,430 |
| Grand total ...         | 491,450 | 20,712 | 483,357 | 22,324 | 12,875,038       | 400,459 | 12,980,292 | 378,997 |

Table showing the yield of the stop-net fisheries of New Jersey in 1897 and 1898.

| Species.           | Atlantic. |        |       |        | Camden. |         |        |        |
|--------------------|-----------|--------|-------|--------|---------|---------|--------|--------|
|                    | 1897.     |        | 1898. |        | 1897.   |         | 1898.  |        |
|                    | Lbs.      | Value. | Lbs.  | Value. | Lbs.    | Value.  | Lbs.   | Value. |
| Shore fisheries:   |           |        |       |        |         |         |        |        |
| Carp .....         |           |        |       |        | 34,645  | \$2,079 | 13,188 | \$791  |
| Perch, white ..... | 665       | \$40   |       |        |         |         |        |        |
| Striped bass ..... | 445       | 80     |       |        |         |         |        |        |
| Total .....        | 1,110     | 120    |       |        | 34,645  | 2,079   | 13,188 | 791    |

| Species.                     | Cape May. |       |       |      | Cumberland. |       |       |       | Gloucester. |       |        |       |
|------------------------------|-----------|-------|-------|------|-------------|-------|-------|-------|-------------|-------|--------|-------|
|                              | 1897.     |       | 1898. |      | 1897.       |       | 1898. |       | 1897.       |       | 1898.  |       |
|                              | Lbs.      | Val.  | Lbs.  | Val. | Lbs.        | Val.  | Lbs.  | Val.  | Lbs.        | Val.  | Lbs.   | Val.  |
| Vessel fisheries:            |           |       |       |      |             |       |       |       |             |       |        |       |
| Carp .....                   | 8,000     | \$240 | 2,000 | \$60 |             |       |       |       | 8,100       | \$405 | 4,200  | \$252 |
| Shore fisheries:             |           |       |       |      |             |       |       |       |             |       |        |       |
| Carp .....                   |           |       |       |      | 15,500      | \$530 | 6,085 | \$204 | 134,700     | 6,915 | 56,300 | 3,378 |
| Total vessel and shore ..... | 8,000     | 240   | 2,000 | 60   | 15,500      | 530   | 6,085 | 204   | 142,800     | 7,320 | 60,500 | 3,630 |

| Species.                     | Salem.  |         |        |         | Total.  |        |         |        |
|------------------------------|---------|---------|--------|---------|---------|--------|---------|--------|
|                              | 1897.   |         | 1898.  |         | 1897.   |        | 1898.   |        |
|                              | Lbs.    | Value.  | Lbs.   | Value.  | Lbs.    | Value. | Lbs.    | Value. |
| Vessel fisheries:            |         |         |        |         |         |        |         |        |
| Carp .....                   |         |         |        |         | 16,100  | \$645  | 6,200   | \$312  |
| Shore fisheries:             |         |         |        |         |         |        |         |        |
| Carp .....                   | 199,800 | \$9,990 | 43,600 | \$2,574 | 384,645 | 19,514 | 119,173 | 6,947  |
| Cat-fish .....               | 6,600   | 330     | 4,000  | 200     | 6,600   | 330    | 4,000   | 200    |
| Perch, white .....           | 200     | 8       | 300    | 12      | 865     | 48     | 300     | 12     |
| Striped bass .....           |         |         |        |         | 445     | 80     |         |        |
| Total .....                  | 206,600 | 10,328  | 47,900 | 2,786   | 392,555 | 19,972 | 123,473 | 7,159  |
| Total vessel and shore ..... | 206,600 | 10,328  | 47,900 | 2,786   | 408,655 | 20,617 | 129,673 | 7,471  |

Table showing the yield of the pound-net and weir fisheries of New Jersey in 1897 and 1898.

| Species.               | Atlantic. |        |         |        | Cape May. |        |           |        |
|------------------------|-----------|--------|---------|--------|-----------|--------|-----------|--------|
|                        | 1897.     |        | 1898.   |        | 1897.     |        | 1898.     |        |
|                        | Lbs.      | Value. | Lbs.    | Value. | Lbs.      | Value. | Lbs.      | Value. |
| Shore fisheries:       |           |        |         |        |           |        |           |        |
| Albacore .....         |           |        |         |        | 4,000     | \$80   | 4,000     | \$80   |
| Blue-fish .....        | 100       | \$5    | 100     | \$5    | 8,283     | 339    | 8,320     | 342    |
| Butter-fish .....      | 10,000    | 500    | 10,000  | 500    | 41,257    | 1,482  | 38,617    | 1,350  |
| Cod .....              | 12,000    | 180    | 9,000   | 180    | 8,000     | 160    | 8,000     | 160    |
| Croakers .....         |           |        |         |        | 12,000    | 240    | 12,000    | 240    |
| Drum .....             | 200       | 2      | 200     | 2      | 2,575     | 38     | 3,100     | 30     |
| Eels .....             | 1,000     | 30     | 1,000   | 30     | 11,066    | 581    | 6,266     | 329    |
| Flounders .....        | 15,000    | 300    | 11,200  | 224    | 14,500    | 385    | 10,800    | 301    |
| Hake .....             |           |        |         |        | 5,100     | 210    | 3,400     | 108    |
| Hickory shad .....     |           |        |         |        | 2,000     | 160    | 2,000     | 160    |
| King-fish .....        | 6,000     | 300    | 6,000   | 300    | 4,617     | 655    | 4,434     | 635    |
| Menhaden .....         |           |        |         |        | 306,000   | 808    | 80,000    | 538    |
| Mullet .....           |           |        |         |        | 250       | 5      | 100       | 2      |
| Perch, white .....     | 1,500     | 120    | 1,000   | 80     | 7,800     | 544    | 5,010     | 327    |
| Pompano .....          |           |        |         |        | 40        | 10     | 40        | 10     |
| Scup .....             |           |        |         |        | 40,000    | 1,200  | 40,000    | 1,200  |
| Shad .....             | 150       | 9      | 100     | 5      | 3,882     | 174    | 3,480     | 154    |
| Sheepshead .....       | 100       | 10     | 80      | 8      | 2,000     | 400    | 2,000     | 400    |
| Spanish mackerel ..... |           |        |         |        | 3,000     | 600    | 2,400     | 480    |
| Spots .....            |           |        |         |        | 8,550     | 186    | 8,600     | 190    |
| Squeteague .....       | 80,000    | 900    | 112,000 | 1,000  | 479,168   | 10,172 | 585,335   | 12,200 |
| Striped bass .....     | 3,000     | 300    | 2,000   | 200    | 21,230    | 2,127  | 14,300    | 1,435  |
| Sturgeon .....         |           |        |         |        | 1,500     | 60     | 1,500     | 60     |
| Tautog .....           |           |        |         |        | 400       | 12     | 400       | 12     |
| Crabs, hard .....      |           |        |         |        | 29,587    | 868    | 31,096    | 920    |
| King crabs .....       |           |        |         |        | 926,800   | 3,912  | 906,190   | 3,873  |
| Total .....            | 129,050   | 2,656  | 152,680 | 2,534  | 1,943,605 | 25,408 | 1,781,388 | 25,536 |

Table showing the yield of the pound-net and weir fisheries of New Jersey in 1897 and 1898—Continued.

| Species.              | Middlesex. |        |       |        | Ocean.  |        |         |         |
|-----------------------|------------|--------|-------|--------|---------|--------|---------|---------|
|                       | 1897.      |        | 1898. |        | 1897.   |        | 1898.   |         |
|                       | Lbs.       | Value. | Lbs.  | Value. | Lbs.    | Value. | Lbs.    | Value.  |
| Shore fisheries:      |            |        |       |        |         |        |         |         |
| Albacore.....         |            |        |       |        | 1,000   | \$10   |         |         |
| Blue-fish.....        |            |        |       |        | 2,000   | 60     | 20,000  | \$1,000 |
| Bonito.....           |            |        |       |        | 8,000   | 240    | 30,000  | 750     |
| Butter-fish.....      |            |        |       |        | 9,000   | 180    | 40,000  | 2,000   |
| Cero.....             |            |        |       |        | 150     | 6      | 500     | 20      |
| Cod.....              |            |        |       |        | 1,000   | 30     | 20,000  | 400     |
| Croakers.....         |            |        |       |        | 6,000   | 120    | 6,000   | 120     |
| Flounders.....        |            |        |       |        | 15,000  | 300    | 25,000  | 500     |
| King-fish.....        |            |        |       |        | 250     | 29     | 400     | 48      |
| Menhaden.....         | 120,000    | \$200  |       |        | 21,000  | 88     |         |         |
| Scup.....             |            |        |       |        | 12,000  | 229    | 10,000  | 200     |
| Sea bass.....         |            |        |       |        | 9,000   | 160    | 1,000   | 30      |
| Shad.....             |            |        |       |        | 1,600   | 58     | 1,200   | 45      |
| Sheepshead.....       |            |        |       |        | 50      | 6      | 120     | 18      |
| Spanish mackerel..... |            |        |       |        | 5,500   | 550    | 3,000   | 750     |
| Spots.....            |            |        |       |        | 100     | 1      | 500     | 20      |
| Squeteague.....       | 2,000      | 100    |       |        | 550,000 | 7,750  | 270,000 | 4,050   |
| Sturgeon.....         |            |        |       |        | 700     | 30     | 1,000   | 70      |
| Tautog.....           |            |        |       |        | 500     | 7      |         |         |
| Caviar.....           |            |        |       |        |         |        | 100     | 45      |
| Total.....            | 122,000    | 300    |       |        | 642,850 | 9,854  | 428,820 | 10,066  |

| Species.                  | Monmouth.  |         |            |         | Total.     |         |            |         |
|---------------------------|------------|---------|------------|---------|------------|---------|------------|---------|
|                           | 1897.      |         | 1898.      |         | 1897.      |         | 1898.      |         |
|                           | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.       | Value.  |
| Shore fisheries:          |            |         |            |         |            |         |            |         |
| Albacore.....             | 7,150      | \$134   | 9,750      | \$157   | 12,150     | \$224   | 13,750     | \$237   |
| Alewives.....             | 26,000     | 520     | 16,250     | 325     | 26,000     | 520     | 16,250     | 325     |
| Blue-fish.....            | 61,100     | 2,107   | 66,470     | 2,233   | 71,483     | 2,511   | 94,890     | 3,580   |
| Bonito.....               | 270,000    | 6,970   | 245,722    | 6,152   | 278,000    | 7,210   | 275,722    | 6,902   |
| Butter-fish.....          | 152,900    | 3,535   | 169,660    | 4,029   | 213,157    | 5,697   | 258,277    | 7,879   |
| Cero.....                 | 4,950      | 154     | 5,170      | 159     | 5,100      | 160     | 5,670      | 179     |
| Cod.....                  | 1,170,000  | 14,425  | 243,000    | 4,850   | 1,191,000  | 14,795  | 280,000    | 5,590   |
| Croakers.....             | 57,800     | 1,114   | 123,010    | 2,250   | 75,800     | 1,474   | 141,010    | 2,610   |
| Drum.....                 | 2,500      | 28      | 2,044      | 21      | 5,275      | 68      | 5,344      | 53      |
| Eels.....                 | 300        | 11      | 230        | 6       | 12,366     | 622     | 7,496      | 365     |
| Flounders.....            | 435,600    | 7,982   | 490,800    | 9,505   | 480,100    | 8,967   | 537,800    | 10,530  |
| Haddock.....              | 100        | 3       | 100        | 3       | 100        | 3       | 100        | 3       |
| Hake.....                 | 14,600     | 161     | 15,442     | 173     | 19,700     | 371     | 18,842     | 281     |
| Hickory shad.....         | 1,719      | 69      | 1,506      | 60      | 3,719      | 229     | 3,500      | 220     |
| King-fish.....            | 6,530      | 842     | 5,988      | 781     | 17,397     | 1,826   | 16,822     | 1,764   |
| Mackerel.....             | 24,300     | 1,628   | 16,480     | 1,322   | 24,300     | 1,628   | 16,480     | 1,322   |
| Menhaden.....             | 4,446,300  | 11,283  | 3,425,500  | 8,427   | 4,893,300  | 12,379  | 3,505,500  | 8,965   |
| Mullet.....               |            |         | 2,500      | 50      | 250        | 5       | 2,600      | 52      |
| Perch, white.....         |            |         |            |         | 9,300      | 664     | 6,010      | 407     |
| Pollack.....              | 300        | 9       | 300        | 9       | 300        | 9       | 300        | 9       |
| Pompano.....              |            |         |            |         | 40         | 10      | 40         | 10      |
| Salmon.....               | 1,021      | 358     | 1,025      | 360     | 1,021      | 358     | 1,025      | 360     |
| Scup.....                 | 499,100    | 7,002   | 289,150    | 4,626   | 551,100    | 8,431   | 339,150    | 6,026   |
| Sea bass.....             | 328,400    | 5,958   | 186,468    | 3,577   | 337,400    | 6,118   | 187,468    | 3,607   |
| Shad.....                 | 82,672     | 3,988   | 63,100     | 3,003   | 88,304     | 4,229   | 67,880     | 3,207   |
| Sheepshead.....           | 7,050      | 867     | 7,265      | 910     | 9,200      | 1,283   | 9,465      | 1,336   |
| Skates.....               | 7,650      | 191     | 6,750      | 169     | 7,650      | 191     | 6,750      | 169     |
| Spanish mackerel.....     | 85,500     | 8,637   | 61,300     | 6,347   | 94,000     | 9,787   | 66,700     | 7,577   |
| Spots.....                | 2,300      | 43      | 3,000      | 96      | 10,950     | 230     | 12,100     | 306     |
| Squeteague.....           | 5,400,019  | 95,427  | 6,161,953  | 116,307 | 6,511,187  | 114,349 | 7,129,288  | 133,557 |
| Striped bass.....         |            |         |            |         | 24,230     | 2,427   | 16,300     | 1,635   |
| Sturgeon.....             | 19,358     | 936     | 15,723     | 758     | 21,558     | 1,026   | 18,223     | 888     |
| Tautog.....               | 59,400     | 1,163   | 70,348     | 1,380   | 60,300     | 1,182   | 70,748     | 1,392   |
| Tomcod or frost-fish..... | 1,000      | 5       | 1,350      | 7       | 1,000      | 5       | 1,350      | 7       |
| Crabs, hard.....          |            |         |            |         | 29,587     | 868     | 31,096     | 920     |
| King crabs.....           |            |         |            |         | 926,800    | 3,912   | 906,190    | 3,873   |
| Caviar.....               | 600        | 300     | 603        | 267     | 600        | 300     | 703        | 312     |
| Total.....                | 13,176,219 | 175,850 | 11,707,951 | 178,319 | 16,013,724 | 214,068 | 14,070,839 | 216,455 |

Table showing, by counties, the yield of the fyke-net fisheries of New Jersey in 1897 and 1898.

| Species.                  | Atlantic. |        |        |        | Burlington. |        |        |        |
|---------------------------|-----------|--------|--------|--------|-------------|--------|--------|--------|
|                           | 1897.     |        | 1898.  |        | 1897.       |        | 1898.  |        |
|                           | Lbs.      | Value. | Lbs.   | Value. | Lbs.        | Value. | Lbs.   | Value. |
| Vessel fisheries:         |           |        |        |        |             |        |        |        |
| Perch, white .....        | 1,500     | \$90   | 4,100  | \$246  | 3,930       | \$255  | 2,045  | \$132  |
| Striped bass .....        | 1,500     | 225    | 130    | 20     | 620         | 84     | 315    | 42     |
| Total .....               | 3,000     | 315    | 4,230  | 266    | 4,550       | 339    | 2,360  | 174    |
| Shore fisheries:          |           |        |        |        |             |        |        |        |
| Cat-fish .....            |           |        | 200    | 10     | 22,305      | 999    | 23,957 | 1,070  |
| Eels .....                |           |        | 267    | 10     | 24,999      | 1,338  | 24,373 | 1,276  |
| Flounders .....           |           |        |        |        | 680         | 34     | 700    | 35     |
| Perch, white .....        | 22,735    | 988    | 19,980 | 886    | 37,085      | 2,462  | 32,365 | 2,025  |
| Striped bass .....        | 6,765     | 807    | 3,172  | 352    | 8,007       | 1,141  | 5,578  | 790    |
| Turtles .....             | 600       | 36     | 1,000  | 60     |             |        |        |        |
| Total .....               | 30,100    | 1,831  | 24,619 | 1,318  | 93,076      | 5,974  | 86,973 | 5,196  |
| Total vessel and shore... | 33,100    | 2,146  | 28,849 | 1,584  | 97,626      | 6,313  | 89,333 | 5,370  |

| Species.           | Gloucester. |         |        |         | Hudson. |        |         |        |
|--------------------|-------------|---------|--------|---------|---------|--------|---------|--------|
|                    | 1897.       |         | 1898.  |         | 1897.   |        | 1898.   |        |
|                    | Lbs.        | Value.  | Lbs.   | Value.  | Lbs.    | Value. | Lbs.    | Value. |
| Shore fisheries:   |             |         |        |         |         |        |         |        |
| Cat-fish .....     | 29,100      | \$1,538 | 26,733 | \$1,408 |         |        |         |        |
| Eels .....         | 22,177      | 1,331   | 23,866 | 1,432   | 1,000   | \$85   | 2,333   | \$170  |
| Shad .....         |             |         |        |         | 286,000 | 10,405 | 222,900 | 6,905  |
| Striped bass ..... |             |         |        |         | 1,450   | 163    | 990     | 105    |
| Total .....        | 51,277      | 2,869   | 50,599 | 2,840   | 288,450 | 10,653 | 226,223 | 7,180  |

| Species.           | Mercer. |         |        |         | Middlesex. |        |        |        |
|--------------------|---------|---------|--------|---------|------------|--------|--------|--------|
|                    | 1897.   |         | 1898.  |         | 1897.      |        | 1898.  |        |
|                    | Lbs.    | Value.  | Lbs.   | Value.  | Lbs.       | Value. | Lbs.   | Value. |
| Shore fisheries:   |         |         |        |         |            |        |        |        |
| Cat-fish .....     | 21,915  | \$1,007 | 22,432 | \$1,196 |            |        |        |        |
| Eels .....         | 15,756  | 945     | 16,946 | 1,017   |            |        |        |        |
| Flounders .....    |         |         |        |         | 2,000      | \$100  | 2,000  | \$100  |
| Perch, white ..... |         |         |        |         |            |        | 2,000  | 100    |
| Shad .....         |         |         |        |         | 6,500      | 390    | 4,750  | 285    |
| Squeteague .....   |         |         |        |         | 300        | 18     | 500    | 30     |
| Striped bass ..... |         |         |        |         | 1,000      | 60     | 1,200  | 96     |
| Crabs, hard .....  |         |         |        |         |            |        | 1,200  | 45     |
| Total .....        | 37,671  | 1,952   | 39,378 | 2,213   | 9,800      | 568    | 11,650 | 656    |

| Species.                  | Cape May. |        |        |        | Ocean. |         |        |        |
|---------------------------|-----------|--------|--------|--------|--------|---------|--------|--------|
|                           | 1897.     |        | 1898.  |        | 1897.  |         | 1898.  |        |
|                           | Lbs.      | Value. | Lbs.   | Value. | Lbs.   | Value.  | Lbs.   | Value. |
| Vessel fisheries:         |           |        |        |        |        |         |        |        |
| Cat-fish .....            | 2,700     | \$162  | 3,200  | \$192  |        |         |        |        |
| Eels .....                | 2,533     | 95     | 2,000  | 75     |        |         |        |        |
| Total .....               | 5,233     | 257    | 5,200  | 267    |        |         |        |        |
| Shore fisheries:          |           |        |        |        |        |         |        |        |
| Alewives .....            |           |        |        |        |        |         | 750    | \$15   |
| Cat-fish .....            | 125       | 10     | 100    | 8      |        |         |        |        |
| Eels .....                | 7,466     | 656    | 18,666 | 1,012  |        |         |        |        |
| Flounders .....           | 1,100     | 55     | 1,400  | 64     | 74,400 | \$3,045 | 89,040 | 3,977  |
| Perch, white .....        | 1,085     | 70     | 4,335  | 330    | 5,155  | 368     | 5,945  | 408    |
| Striped bass .....        | 3,200     | 320    | 6,650  | 665    | 1,625  | 175     | 1,495  | 162    |
| Total .....               | 12,976    | 1,111  | 31,151 | 2,079  | 81,180 | 3,588   | 97,230 | 4,562  |
| Total vessel and shore... | 18,209    | 1,368  | 36,351 | 2,346  | 81,180 | 3,588   | 97,230 | 4,562  |

246 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the yield of the fyke-net fisheries of New Jersey in 1897 and 1898—Cont'd.

| Species.         | Camden. |        |        |        | Cumberland. |         |        |        |
|------------------|---------|--------|--------|--------|-------------|---------|--------|--------|
|                  | 1897.   |        | 1898.  |        | 1897.       |         | 1898.  |        |
|                  | Lbs.    | Value. | Lbs.   | Value. | Lbs.        | Value.  | Lbs.   | Value. |
| Shore fisheries: |         |        |        |        |             |         |        |        |
| Cat-fish .....   | 2,400   | \$120  | 4,900  | \$245  | 20,300      | \$1,110 | 17,945 | \$976  |
| Eels .....       | 12,400  | 744    | 10,132 | 608    | 7,733       | 324     | 6,100  | 352    |
| Turtles .....    |         |        |        |        | 2,700       | 216     | 2,100  | 168    |
| Total .....      | 14,800  | 864    | 15,032 | 853    | 30,733      | 1,650   | 26,145 | 1,496  |

| Species.                   | Monmouth. |        |         |        | Total.  |        |         |        |
|----------------------------|-----------|--------|---------|--------|---------|--------|---------|--------|
|                            | 1897.     |        | 1898.   |        | 1897.   |        | 1898.   |        |
|                            | Lbs.      | Value. | Lbs.    | Value. | Lbs.    | Value. | Lbs.    | Value. |
| Vessel fisheries:          |           |        |         |        |         |        |         |        |
| Cat-fish .....             |           |        |         |        | 2,700   | \$162  | 3,200   | \$192  |
| Eels .....                 |           |        |         |        | 2,533   | 95     | 2,000   | 75     |
| Flounders .....            | 16,000    | \$640  | 8,000   | \$480  | 16,000  | 640    | 8,000   | 480    |
| Perch, white .....         |           |        |         |        | 5,430   | 345    | 6,145   | 378    |
| Striped bass .....         |           |        |         |        | 2,120   | 309    | 445     | 62     |
| Total .....                | 16,000    | 640    | 8,000   | 480    | 28,783  | 1,551  | 19,790  | 1,187  |
| Shore fisheries:           |           |        |         |        |         |        |         |        |
| Alewives .....             | 1,000     | 20     | 1,000   | 20     | 1,000   | 20     | 1,750   | 35     |
| Blue-fish .....            | 1,300     | 65     | 1,400   | 70     | 1,300   | 65     | 1,400   | 70     |
| Cat-fish .....             |           |        |         |        | 96,145  | 4,784  | 96,267  | 4,913  |
| Eels .....                 | 52,900    | 2,578  | 55,000  | 2,605  | 144,431 | 8,001  | 157,683 | 8,482  |
| Flounders .....            | 50,975    | 1,901  | 57,675  | 2,407  | 129,155 | 5,135  | 150,815 | 6,583  |
| King-fish .....            | 120       | 22     | 120     | 27     | 120     | 22     | 120     | 27     |
| Menhaden .....             | 17,500    | 33     | 28,000  | 50     | 17,500  | 33     | 28,000  | 50     |
| Mullet .....               | 100       | 6      | 1,000   | 60     | 100     | 6      | 1,000   | 60     |
| Perch, white .....         | 5,450     | 357    | 4,350   | 275    | 71,510  | 4,245  | 68,975  | 4,024  |
| Scup .....                 |           |        | 1,000   | 15     |         |        | 1,000   | 15     |
| Shad .....                 | 128       | 8      | 176     | 12     | 292,628 | 10,803 | 227,826 | 7,202  |
| Squeteague .....           | 16,600    | 350    | 19,500  | 405    | 16,900  | 368    | 20,000  | 435    |
| Striped bass .....         | 3,800     | 405    | 2,800   | 299    | 25,847  | 3,071  | 21,885  | 2,469  |
| Tautog .....               | 25,800    | 514    | 27,600  | 532    | 25,800  | 514    | 27,600  | 532    |
| Tomcod or frost-fish ..... | 650       | 9      | 600     | 8      | 650     | 9      | 600     | 8      |
| Whiting .....              | 4,000     | 50     | 3,100   | 47     | 4,000   | 50     | 3,100   | 47     |
| Crabs, hard .....          |           |        |         |        |         |        | 1,200   | 45     |
| Turtles .....              |           |        |         |        | 3,300   | 252    | 3,100   | 228    |
| Total .....                | 180,323   | 6,318  | 203,321 | 6,832  | 830,386 | 37,378 | 812,321 | 35,225 |
| Total vessel and shore...  | 196,323   | 6,958  | 211,321 | 7,312  | 859,169 | 38,929 | 832,111 | 36,412 |

Table showing, by counties, the yield of the line fisheries of New Jersey in 1897 and 1898.

| Species.                | Middlesex. |        |       |        | Burlington. |        |       |        |
|-------------------------|------------|--------|-------|--------|-------------|--------|-------|--------|
|                         | 1897.      |        | 1898. |        | 1897.       |        | 1898. |        |
|                         | Lbs.       | Value. | Lbs.  | Value. | Lbs.        | Value. | Lbs.  | Value. |
| Shore fisheries:        |            |        |       |        |             |        |       |        |
| Blue-fish .....         | 2,000      | \$100  | 2,000 | \$100  |             |        |       |        |
| Perch, white .....      |            |        |       |        | 500         | \$25   | 500   | \$25   |
| Squeteague, fresh ..... |            |        |       |        | 3,500       | 175    | 3,500 | 175    |
| Total .....             | 2,000      | 100    | 2,000 | 100    | 4,000       | 200    | 4,000 | 200    |

Table showing the yield of the line fisheries of New Jersey in 1897 and 1898—Continued.

| Species.                            | Atlantic.        |               |                  |               | Monmouth.        |                |                  |                |
|-------------------------------------|------------------|---------------|------------------|---------------|------------------|----------------|------------------|----------------|
|                                     | 1897.            |               | 1898.            |               | 1897.            |                | 1898.            |                |
|                                     | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.             | Value.         | Lbs.             | Value.         |
| <b>Vessel fisheries:</b>            |                  |               |                  |               |                  |                |                  |                |
| Blue-fish .....                     | 29,800           | \$1,241       | 36,400           | \$1,509       | 1,000            | \$50           |                  |                |
| Cod .....                           | 753,000          | 24,850        | 722,000          | 27,350        |                  |                |                  |                |
| Croakers .....                      | 10,100           | 149           | 12,370           | 185           |                  |                |                  |                |
| Flounders .....                     | 24,550           | 734           | 25,020           | 723           |                  |                |                  |                |
| Haddock .....                       | 9,525            | 567           | 9,825            | 602           |                  |                |                  |                |
| Hake .....                          | 6,700            | 278           | 6,900            | 287           |                  |                |                  |                |
| King-fish .....                     | 1,100            | 44            | 1,125            | 45            |                  |                |                  |                |
| Scup .....                          | 24,200           | 561           | 31,000           | 717           |                  |                |                  |                |
| Sea bass .....                      | 213,000          | 8,185         | 242,300          | 9,307         | 12,000           | 360            | 4,000            | \$100          |
| Sheepshead .....                    | 4,100            | 738           | 5,100            | 918           |                  |                |                  |                |
| Squeteague .....                    | 44,500           | 1,191         | 47,125           | 1,261         |                  |                |                  |                |
| <b>Total .....</b>                  | <b>1,120,575</b> | <b>38,538</b> | <b>1,139,165</b> | <b>42,904</b> | <b>13,000</b>    | <b>410</b>     | <b>4,000</b>     | <b>100</b>     |
| <b>Shore fisheries:</b>             |                  |               |                  |               |                  |                |                  |                |
| Blue-fish .....                     | 98,250           | 4,137         | 99,250           | 4,194         | 4,079,500        | 107,235        | 4,019,000        | 120,795        |
| Bonito .....                        |                  |               |                  |               | 65,500           | 2,000          | 85,500           | 2,595          |
| Cod .....                           | 291,500          | 8,738         | 271,500          | 8,138         | 1,052,000        | 18,195         | 956,950          | 30,060         |
| Croakers .....                      | 30,500           | 432           | 27,500           | 430           |                  |                |                  |                |
| Drum .....                          | 2,200            | 22            | 2,200            | 22            |                  |                |                  |                |
| Eels .....                          | 4,266            | 164           | 4,533            | 176           | 2,000            | 60             | 3,000            | 90             |
| Flounders .....                     | 143,350          | 3,467         | 140,400          | 3,488         | 241,100          | 4,822          | 263,500          | 5,270          |
| Haddock .....                       | 2,000            | 120           | 2,000            | 120           | 154,300          | 2,344          | 214,300          | 6,544          |
| Hake .....                          | 3,000            | 120           | 3,000            | 120           | 26,700           | 485            | 41,500           | 990            |
| King-fish .....                     | 11,700           | 582           | 11,925           | 595           |                  |                |                  |                |
| Scup .....                          | 30,700           | 582           | 30,850           | 591           | 15,200           | 404            | 26,000           | 770            |
| Sea bass .....                      | 155,350          | 6,260         | 141,300          | 5,717         | 657,200          | 25,398         | 712,150          | 27,489         |
| Sheepshead .....                    | 26,535           | 4,743         | 21,600           | 3,856         |                  |                |                  |                |
| Skates .....                        |                  |               |                  |               | 4,000            | 100            | 6,000            | 150            |
| Spanish mackerel .....              |                  |               |                  |               | 100              | 10             | 100              | 10             |
| Spots .....                         | 200              | 8             | 200              | 8             |                  |                |                  |                |
| Squeteague, fresh .....             | 661,700          | 21,185        | 724,200          | 23,315        | 32,300           | 846            | 36,500           | 940            |
| Tautog .....                        | 600              | 30            | 600              | 30            | 202,500          | 3,780          | 215,600          | 4,068          |
| Crabs, hard .....                   | 64,000           | 2,500         | 64,000           | 2,500         |                  |                |                  |                |
| <b>Total .....</b>                  | <b>1,525,851</b> | <b>53,090</b> | <b>1,545,058</b> | <b>53,300</b> | <b>6,532,400</b> | <b>165,679</b> | <b>6,580,100</b> | <b>199,771</b> |
| <b>Total vessel and shore .....</b> | <b>2,646,426</b> | <b>91,628</b> | <b>2,684,223</b> | <b>96,204</b> | <b>6,545,400</b> | <b>166,089</b> | <b>6,584,100</b> | <b>199,871</b> |

| Species.                            | Cumberland.   |              |               |              | Hunterdon.   |            |              |            |
|-------------------------------------|---------------|--------------|---------------|--------------|--------------|------------|--------------|------------|
|                                     | 1897.         |              | 1898.         |              | 1897.        |            | 1898.        |            |
|                                     | Lbs.          | Value.       | Lbs.          | Value.       | Lbs.         | Value.     | Lbs.         | Value.     |
| <b>Vessel fisheries:</b>            |               |              |               |              |              |            |              |            |
| Croakers .....                      |               |              | 6,000         | \$150        |              |            |              |            |
| Scup .....                          |               |              | 200           | 5            |              |            |              |            |
| Sea bass .....                      |               |              | 3,000         | 120          |              |            |              |            |
| Squeteague .....                    |               |              | 5,000         | 150          |              |            |              |            |
| <b>Total .....</b>                  |               |              | <b>14,200</b> | <b>425</b>   |              |            |              |            |
| <b>Shore fisheries:</b>             |               |              |               |              |              |            |              |            |
| Black bass .....                    |               |              |               |              | 150          | \$12       | 100          | \$8        |
| Cat-fish .....                      |               |              |               |              | 400          | 20         | 300          | 15         |
| Eels .....                          |               |              |               |              | 133          | 10         | 133          | 10         |
| Squeteague, fresh .....             | 29,500        | \$1,235      | 26,100        | 1,125        |              |            |              |            |
| Striped bass .....                  |               |              |               |              | 800          | 80         | 1,600        | 160        |
| <b>Total .....</b>                  | <b>29,500</b> | <b>1,235</b> | <b>26,100</b> | <b>1,125</b> | <b>1,483</b> | <b>122</b> | <b>2,133</b> | <b>193</b> |
| <b>Total vessel and shore .....</b> | <b>29,500</b> | <b>1,235</b> | <b>40,300</b> | <b>1,550</b> | <b>1,483</b> | <b>122</b> | <b>2,133</b> | <b>193</b> |



Table showing the yield of the line fisheries of New Jersey in 1897 and 1898—Continued.

| Species.                           | Camden.        |              |                |              | Cape May.        |               |                  |               |
|------------------------------------|----------------|--------------|----------------|--------------|------------------|---------------|------------------|---------------|
|                                    | 1897.          |              | 1898.          |              | 1897.            |               | 1898.            |               |
|                                    | Lbs.           | Value.       | Lbs.           | Value.       | Lbs.             | Value.        | Lbs.             | Value.        |
| <b>Vessel fisheries:</b>           |                |              |                |              |                  |               |                  |               |
| Blue-fish .....                    | 7,500          | \$300        | 6,000          | \$240        | 3,650            | \$110         | 1,840            | \$55          |
| Cod .....                          |                |              |                |              | 10,300           | 258           | 600              | 16            |
| Croakers .....                     |                |              |                |              | 15,300           | 306           | 16,700           | 334           |
| Drum .....                         |                |              |                |              | 600              | 6             | 800              | 8             |
| Flounders .....                    | 5,200          | 130          | 5,000          | 125          | 3,200            | 96            | 2,725            | 87            |
| King-fish .....                    |                |              |                |              | 75               | 19            | 90               | 22            |
| Scup .....                         | 6,000          | 150          | 7,200          | 180          | 5,650            | 170           | 9,165            | 275           |
| Sea bass .....                     | 120,000        | 4,800        | 112,000        | 4,480        | 33,765           | 957           | 33,665           | 1,010         |
| Sheepshead .....                   |                |              |                |              |                  |               | 20               | 3             |
| Squeteague .....                   |                |              |                |              | 20,000           | 400           | 21,700           | 434           |
| <b>Total.....</b>                  | <b>138,700</b> | <b>5,380</b> | <b>130,200</b> | <b>5,025</b> | <b>92,540</b>    | <b>2,322</b>  | <b>87,905</b>    | <b>2,244</b>  |
| <b>Shore fisheries:</b>            |                |              |                |              |                  |               |                  |               |
| Albacore .....                     |                |              |                |              | 1,970            | 70            | 2,800            | 96            |
| Blue-fish .....                    |                |              |                |              | 230,075          | 10,442        | 314,840          | 14,365        |
| Bonito .....                       |                |              |                |              | 3,700            | 165           | 4,700            | 209           |
| Cat-fish .....                     | 4,100          | 205          | 3,000          | 150          |                  |               |                  |               |
| Cod .....                          |                |              |                |              | 152,540          | 3,716         | 199,850          | 5,330         |
| Croakers .....                     |                |              |                |              | 138,900          | 2,456         | 195,800          | 3,464         |
| Drum .....                         |                |              |                |              | 63,100           | 628           | 62,700           | 623           |
| Eels .....                         | 1,066          | 64           | 1,466          | 88           | 2,100            | 103           | 3,333            | 175           |
| Flounders .....                    |                |              |                |              | 32,060           | 864           | 47,400           | 1,284         |
| Hake .....                         |                |              |                |              | 11,835           | 248           | 20,800           | 407           |
| King-fish .....                    |                |              |                |              | 6,000            | 821           | 7,800            | 1,025         |
| Perch, white .....                 | 346            | 14           | 300            | 12           |                  |               |                  |               |
| Scup .....                         |                |              |                |              | 120,000          | 3,398         | 174,500          | 4,328         |
| Sea bass .....                     |                |              |                |              | 432,600          | 16,528        | 549,000          | 20,880        |
| Sheepshead .....                   |                |              |                |              | 450              | 68            | 500              | 75            |
| Spanish mackerel .....             |                |              |                |              | 1,280            | 138           | 5,100            | 695           |
| Spots .....                        |                |              |                |              | 1,200            | 120           | 1,200            | 120           |
| Squeteague, fresh .....            |                |              |                |              | 279,350          | 7,174         | 349,600          | 8,859         |
| Squeteague, salted .....           |                |              |                |              | 16,700           | 961           | 16,650           | 957           |
| Striped bass .....                 | 2,100          | 210          | 1,600          | 160          | 100              | 10            | 150              | 15            |
| Tomcod or frost-fish .....         |                |              |                |              | 200              | 6             | 200              | 6             |
| <b>Total.....</b>                  | <b>7,612</b>   | <b>493</b>   | <b>6,366</b>   | <b>410</b>   | <b>1,494,160</b> | <b>47,916</b> | <b>1,956,423</b> | <b>63,513</b> |
| <b>Total vessel and shore.....</b> | <b>146,312</b> | <b>5,873</b> | <b>136,566</b> | <b>5,435</b> | <b>1,586,700</b> | <b>50,238</b> | <b>2,043,728</b> | <b>65,757</b> |

| Species.                           | Ocean.         |               |                |               | Salem.        |              |               |              |
|------------------------------------|----------------|---------------|----------------|---------------|---------------|--------------|---------------|--------------|
|                                    | 1897.          |               | 1898.          |               | 1897.         |              | 1898.         |              |
|                                    | Lbs.           | Value.        | Lbs.           | Value.        | Lbs.          | Value.       | Lbs.          | Value.       |
| <b>Vessel fisheries:</b>           |                |               |                |               |               |              |               |              |
| Squeteague .....                   |                |               |                |               | 9,900         | \$558        | 12,500        | \$706        |
| <b>Shore fisheries:</b>            |                |               |                |               |               |              |               |              |
| Blue-fish .....                    | 304,165        | \$8,304       | 234,800        | \$6,845       |               |              |               |              |
| Bonito .....                       | 8,000          | 135           | 9,200          | 181           |               |              |               |              |
| Cod .....                          | 29,000         | 616           | 151,700        | 5,876         |               |              |               |              |
| Flounders .....                    | 42,150         | 933           | 54,350         | 1,117         |               |              |               |              |
| Haddock .....                      | 1,450          | 26            | 13,825         | 537           |               |              |               |              |
| Hake .....                         | 1,800          | 36            | 7,000          | 274           |               |              |               |              |
| King-fish .....                    | 350            | 50            | 350            | 50            |               |              |               |              |
| Perch, white .....                 | 600            | 36            | 150            | 9             |               |              |               |              |
| Scup .....                         | 800            | 16            | 2,500          | 52            |               |              |               |              |
| Sea bass .....                     | 162,365        | 5,509         | 201,065        | 7,063         |               |              |               |              |
| Sheepshead .....                   | 400            | 40            | 50             | 5             |               |              |               |              |
| Squeteague, fresh .....            | 59,800         | 2,517         | 60,700         | 2,563         | 18,000        | 1,005        | 15,000        | 841          |
| Squeteague, salted .....           | 200            | 10            | 100            | 5             |               |              |               |              |
| Striped bass .....                 | 2,270          | 325           | 1,650          | 233           |               |              |               |              |
| Turtles .....                      | 1,650          | 114           | 1,650          | 114           |               |              |               |              |
| <b>Total.....</b>                  | <b>615,000</b> | <b>18,667</b> | <b>739,090</b> | <b>24,924</b> | <b>18,000</b> | <b>1,005</b> | <b>15,000</b> | <b>841</b>   |
| <b>Total vessel and shore.....</b> | <b>615,000</b> | <b>18,667</b> | <b>739,090</b> | <b>24,924</b> | <b>27,900</b> | <b>1,563</b> | <b>27,500</b> | <b>1,547</b> |

*Summary of the yield of the line fisheries of New Jersey in 1897 and 1898.*

| Species.                            | 1897.             |                | 1898.             |                |
|-------------------------------------|-------------------|----------------|-------------------|----------------|
|                                     | Lbs.              | Value.         | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>            |                   |                |                   |                |
| Blue-fish .....                     | 41,950            | \$1,701        | 44,240            | \$1,804        |
| Cod .....                           | 763,300           | 25,108         | 722,600           | 27,366         |
| Croakers .....                      | 25,400            | 455            | 35,070            | 669            |
| Drum .....                          | 600               | 6              | 800               | 8              |
| Flounders .....                     | 32,950            | 960            | 32,745            | 935            |
| Haddock .....                       | 9,525             | 567            | 9,825             | 602            |
| Hake .....                          | 6,700             | 278            | 6,900             | 287            |
| King-fish .....                     | 1,175             | 63             | 1,215             | 67             |
| Scup .....                          | 85,850            | 881            | 47,565            | 1,177          |
| Sea bass .....                      | 378,765           | 14,302         | 394,965           | 15,017         |
| Sheepshead .....                    | 4,100             | 738            | 5,120             | 921            |
| Squeteague .....                    | 74,400            | 2,149          | 86,325            | 2,551          |
| <b>Total .....</b>                  | <b>1,374,715</b>  | <b>47,208</b>  | <b>1,387,370</b>  | <b>51,404</b>  |
| <b>Shore fisheries:</b>             |                   |                |                   |                |
| Albacore .....                      | 1,970             | 70             | 2,800             | 96             |
| Black bass .....                    | 150               | 12             | 100               | 8              |
| Blue-fish .....                     | 4,713,990         | 130,218        | 4,669,890         | 146,299        |
| Bonito .....                        | 77,200            | 2,300          | 99,400            | 2,985          |
| Cat-fish .....                      | 4,500             | 225            | 3,300             | 165            |
| Cod .....                           | 1,525,040         | 31,265         | 1,580,000         | 49,404         |
| Croakers .....                      | 169,400           | 2,888          | 223,300           | 3,894          |
| Drum .....                          | 65,300            | 650            | 64,900            | 645            |
| Eels .....                          | 9,565             | 401            | 12,47             | 539            |
| Flounders .....                     | 458,660           | 10,086         | 505,650           | 11,159         |
| Haddock .....                       | 157,750           | 2,490          | 230,125           | 7,201          |
| Hake .....                          | 43,335            | 889            | 72,300            | 1,791          |
| King-fish .....                     | 18,050            | 1,453          | 19,575            | 1,670          |
| Perch, white .....                  | 1,446             | 75             | 950               | 46             |
| Scup .....                          | 166,700           | 4,400          | 233,850           | 6,341          |
| Sea bass .....                      | 1,407,515         | 53,695         | 1,603,515         | 61,149         |
| Sheepshead .....                    | 27,385            | 4,851          | 22,150            | 3,936          |
| Skates .....                        | 4,000             | 100            | 6,000             | 150            |
| Spanish mackerel .....              | 1,380             | 148            | 5,200             | 705            |
| Spots .....                         | 1,400             | 128            | 1,400             | 128            |
| Squeteague, fresh .....             | 1,084,150         | 84,137         | 1,215,600         | 37,818         |
| Squeteague, salted .....            | 16,900            | 971            | 16,750            | 962            |
| Striped bass .....                  | 5,270             | 625            | 5,000             | 568            |
| Tautog .....                        | 203,100           | 3,810          | 216,200           | 4,098          |
| Tomcod or frost-fish .....          | 200               | 6              | 200               | 6              |
| Crabs, hard .....                   | 64,000            | 2,500          | 64,000            | 2,500          |
| Turtles .....                       | 1,650             | 114            | 1,650             | 114            |
| <b>Total .....</b>                  | <b>10,230,006</b> | <b>288,507</b> | <b>10,876,270</b> | <b>344,377</b> |
| <b>Total vessel and shore .....</b> | <b>11,604,721</b> | <b>335,715</b> | <b>12,263,640</b> | <b>395,781</b> |

*Table showing the catch of eels and lobsters by pots in New Jersey in 1897 and 1898.*

| Counties.          | Vessel fisheries. |            |               |            | Shore fisheries. |               |                |               | Total.         |               |
|--------------------|-------------------|------------|---------------|------------|------------------|---------------|----------------|---------------|----------------|---------------|
|                    | Eels.             |            | Lobsters.     |            | Eels.            |               | Lobsters.      |               | Lbs.           | Value.        |
|                    | Lbs.              | Value.     | Lbs.          | Value.     | Lbs.             | Value.        | Lbs.           | Value.        |                |               |
| <b>1897.</b>       |                   |            |               |            |                  |               |                |               |                |               |
| Atlantic .....     |                   |            |               |            | 8,800            | \$352         |                |               | 8,800          | \$352         |
| Bergen .....       |                   |            |               |            | 10,666           | 775           |                |               | 10,666         | 775           |
| Cape May .....     | 20,000            | \$600      |               |            | 1,866            | 56            |                |               | 21,866         | 656           |
| Hudson .....       |                   |            | 5,000         | \$400      | 4,000            | 200           | 26,200         | \$1,790       | 35,200         | 2,390         |
| Middlesex .....    |                   |            |               |            | 11,733           | 704           |                |               | 11,733         | 704           |
| Monmouth .....     |                   |            |               |            | 136,266          | 7,200         | 63,600         | 6,004         | 199,866        | 13,204        |
| Ocean .....        | 4,000             | 120        |               |            | 120,050          | 4,398         | 4,430          | 379           | 128,480        | 4,897         |
| <b>Total .....</b> | <b>24,000</b>     | <b>720</b> | <b>5,000</b>  | <b>400</b> | <b>293,381</b>   | <b>13,685</b> | <b>94,230</b>  | <b>8,173</b>  | <b>416,611</b> | <b>22,978</b> |
| <b>1898.</b>       |                   |            |               |            |                  |               |                |               |                |               |
| Atlantic .....     |                   |            |               |            | 8,666            | 345           |                |               | 8,666          | 345           |
| Bergen .....       |                   |            |               |            | 18,066           | 991           |                |               | 18,066         | 991           |
| Cape May .....     | 17,333            | 650        |               |            | 1,866            | 56            |                |               | 19,199         | 706           |
| Hudson .....       |                   |            | 10,000        | 800        | 6,000            | 300           | 31,250         | 2,540         | 47,250         | 3,640         |
| Middlesex .....    |                   |            |               |            | 15,067           | 910           |                |               | 15,067         | 910           |
| Monmouth .....     |                   |            |               |            | 143,333          | 7,494         | 79,500         | 7,615         | 222,833        | 15,109        |
| Ocean .....        | 6,667             | 240        |               |            | 137,883          | 5,083         | 8,126          | 142           | 147,076        | 5,465         |
| <b>Total .....</b> | <b>24,000</b>     | <b>890</b> | <b>10,000</b> | <b>800</b> | <b>330,881</b>   | <b>15,179</b> | <b>113,876</b> | <b>10,297</b> | <b>478,757</b> | <b>27,166</b> |

# 250 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the catch by dredges, tongs, rakes, etc., in New Jersey in 1897 and 1898.

| Species.                         | Atlantic.        |                |                  |                | Burlington.    |               |                |               |
|----------------------------------|------------------|----------------|------------------|----------------|----------------|---------------|----------------|---------------|
|                                  | 1897.            |                | 1898.            |                | 1897.          |               | 1898.          |               |
|                                  | Lbs.             | Value.         | Lbs.             | Value.         | Lbs.           | Value.        | Lbs.           | Value.        |
| <b>Vessel fisheries:</b>         |                  |                |                  |                |                |               |                |               |
| Oysters, market ...              | 35,840           | \$4,139        | 39,970           | \$4,507        | 2,800          | \$320         | 2,800          | \$320         |
| Oysters, seed .....              | 41,755           | 1,836          | 39,410           | 1,801          | .....          | .....         | .....          | .....         |
| Clams, hard .....                | 56,947           | 5,806          | 53,300           | 5,622          | .....          | .....         | .....          | .....         |
| <b>Total.....</b>                | <b>134,542</b>   | <b>11,781</b>  | <b>132,680</b>   | <b>11,930</b>  | <b>2,800</b>   | <b>320</b>    | <b>2,800</b>   | <b>320</b>    |
| <b>Shore fisheries:</b>          |                  |                |                  |                |                |               |                |               |
| Crabs, hard .....                | 10,000           | 150            | 10,000           | 150            | .....          | .....         | .....          | .....         |
| Oysters, market ...              | 1,195,005        | 183,727        | 1,157,310        | 178,335        | 183,610        | 20,654        | 162,750        | 18,321        |
| Oysters, seed .....              | 308,700          | 12,718         | 285,425          | 13,395         | 24,500         | 1,200         | 24,500         | 1,200         |
| Clams, hard .....                | 856,720          | 90,202         | 796,816          | 87,087         | 81,700         | 7,821         | 76,200         | 7,294         |
| Mussels .....                    | 2,520,000        | 1,575          | 2,360,000        | 1,475          | .....          | .....         | .....          | .....         |
| <b>Total.....</b>                | <b>4,890,425</b> | <b>288,372</b> | <b>4,609,551</b> | <b>280,442</b> | <b>289,810</b> | <b>29,675</b> | <b>263,450</b> | <b>26,815</b> |
| <b>Total vessel and shore...</b> | <b>5,024,967</b> | <b>300,153</b> | <b>4,742,231</b> | <b>292,372</b> | <b>292,610</b> | <b>29,995</b> | <b>266,250</b> | <b>27,135</b> |

| Species.                         | Camden.          |               |                  |                | Cape May.        |                |                  |                |
|----------------------------------|------------------|---------------|------------------|----------------|------------------|----------------|------------------|----------------|
|                                  | 1897.            |               | 1898.            |                | 1897.            |                | 1898.            |                |
|                                  | Lbs.             | Value.        | Lbs.             | Value.         | Lbs.             | Value.         | Lbs.             | Value.         |
| <b>Vessel fisheries:</b>         |                  |               |                  |                |                  |                |                  |                |
| Oysters, market ...              | 409,626          | \$71,958      | 637,903          | \$85,462       | 108,031          | \$18,725       | 152,215          | \$22,124       |
| Oysters, seed .....              | 777,700          | 11,346        | 686,238          | 29,410         | 221,900          | 4,471          | 19,775           | 860            |
| Clams, hard .....                | .....            | .....         | .....            | .....          | 3,022            | 262            | 2,844            | 200            |
| <b>Total.....</b>                | <b>1,187,326</b> | <b>83,304</b> | <b>1,324,141</b> | <b>114,872</b> | <b>332,953</b>   | <b>23,458</b>  | <b>174,884</b>   | <b>23,184</b>  |
| <b>Shore fisheries:</b>          |                  |               |                  |                |                  |                |                  |                |
| Oysters, market ...              | .....            | .....         | .....            | .....          | 354,585          | 48,181         | 353,766          | 49,501         |
| Clams, soft .....                | .....            | .....         | .....            | .....          | 698,240          | 58,639         | 613,153          | 51,949         |
| <b>Total.....</b>                | <b>.....</b>     | <b>.....</b>  | <b>.....</b>     | <b>.....</b>   | <b>1,052,825</b> | <b>106,820</b> | <b>966,919</b>   | <b>101,450</b> |
| <b>Total vessel and shore...</b> | <b>1,187,326</b> | <b>83,304</b> | <b>1,324,141</b> | <b>114,872</b> | <b>1,385,778</b> | <b>130,278</b> | <b>1,141,753</b> | <b>124,634</b> |

| Species.                         | Cumberland.       |                |                  |                | Hudson.        |               |                |               |
|----------------------------------|-------------------|----------------|------------------|----------------|----------------|---------------|----------------|---------------|
|                                  | 1897.             |                | 1898.            |                | 1897.          |               | 1898.          |               |
|                                  | Lbs.              | Value.         | Lbs.             | Value.         | Lbs.           | Value.        | Lbs.           | Value.        |
| <b>Vessel fisheries:</b>         |                   |                |                  |                |                |               |                |               |
| Crabs, hard .....                | .....             | .....          | .....            | .....          | 26,667         | \$800         | .....          | .....         |
| Oysters, market ...              | 3,710,056         | \$641,037      | 3,978,345        | \$578,261      | 385,000        | 28,750        | 420,000        | \$32,500      |
| Oysters, seed .....              | 8,564,990         | 128,744        | 4,677,302        | 200,555        | 38,500         | 1,650         | 42,000         | 3,000         |
| Clams, hard .....                | 2,000             | 250            | 600              | 75             | .....          | .....         | .....          | .....         |
| <b>Total.....</b>                | <b>12,277,046</b> | <b>770,031</b> | <b>8,656,247</b> | <b>778,891</b> | <b>450,167</b> | <b>31,200</b> | <b>462,000</b> | <b>35,500</b> |
| <b>Shore fisheries:</b>          |                   |                |                  |                |                |               |                |               |
| Oysters, market ...              | 77,840            | 13,208         | 59,437           | 8,166          | .....          | .....         | .....          | .....         |
| Oysters, seed .....              | 579,320           | 18,397         | 502,082          | 19,195         | 122,500        | 7,000         | 350,000        | 20,000        |
| <b>Total.....</b>                | <b>657,160</b>    | <b>31,605</b>  | <b>561,519</b>   | <b>27,361</b>  | <b>122,500</b> | <b>7,000</b>  | <b>350,000</b> | <b>20,000</b> |
| <b>Total vessel and shore...</b> | <b>12,934,206</b> | <b>801,636</b> | <b>9,217,766</b> | <b>806,252</b> | <b>572,667</b> | <b>38,200</b> | <b>812,000</b> | <b>55,500</b> |

Table showing the catch by dredges, tongs, rakes, etc., in New Jersey in 1897 and 1898—  
Continued.

| Species.               | Middlesex. |        |         |         | Monmouth. |         |           |         |
|------------------------|------------|--------|---------|---------|-----------|---------|-----------|---------|
|                        | 1897.      |        | 1898.   |         | 1897.     |         | 1898.     |         |
|                        | Lbs.       | Value. | Lbs.    | Value.  | Lbs.      | Value.  | Lbs.      | Value.  |
| Vessel fisheries:      |            |        |         |         |           |         |           |         |
| Crabs, hard            |            |        |         |         | 169,667   | \$4,070 | 374,090   | \$9,091 |
| Oysters, market        |            |        |         |         | 319,900   | 40,100  | 215,670   | 29,492  |
| Oysters, seed          | 1,400      | \$80   |         |         |           |         | 2,800     | 160     |
| Clams, hard            | 800        | 80     | 13,280  | \$1,460 | 706,544   | 87,185  | 647,232   | 80,266  |
| Scallops               | 5,400      | 300    | 5,400   | 300     | 66,600    | 3,700   | 50,400    | 2,800   |
| Mussels                |            |        |         |         |           |         | 5,000     | 250     |
| Total                  | 7,600      | 460    | 18,680  | 1,760   | 1,262,711 | 135,055 | 1,295,192 | 122,059 |
| Shore fisheries:       |            |        |         |         |           |         |           |         |
| Oysters, market        | 151,480    | 21,758 | 326,550 | 45,298  | 999,509   | 145,990 | 819,203   | 117,572 |
| Oysters, seed          | 379,300    | 20,435 | 559,720 | 30,036  |           |         |           |         |
| Clams, hard            | 12,016     | 1,640  | 12,200  | 1,650   | 1,436,344 | 203,469 | 1,421,136 | 202,082 |
| Clams, soft            |            |        |         |         | 703,000   | 61,625  | 755,000   | 64,345  |
| Total                  | 542,796    | 43,833 | 898,470 | 76,984  | 3,138,853 | 411,084 | 2,995,339 | 383,999 |
| Total vessel and shore | 550,396    | 44,293 | 917,150 | 78,744  | 4,401,564 | 546,139 | 4,290,531 | 506,058 |

| Species.               | Ocean.    |         |           |         | Salem. |        |       |        |
|------------------------|-----------|---------|-----------|---------|--------|--------|-------|--------|
|                        | 1897.     |         | 1898.     |         | 1897.  |        | 1898. |        |
|                        | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.   | Value. | Lbs.  | Value. |
| Vessel fisheries:      |           |         |           |         |        |        |       |        |
| Oysters, market        |           |         |           |         |        |        | 2,912 | \$500  |
| Clams, hard            | 22,440    | \$2,345 | 24,040    | \$2,470 |        |        |       |        |
| Total                  | 22,440    | 2,345   | 24,040    | 2,470   |        |        | 2,912 | 500    |
| Shore fisheries:       |           |         |           |         |        |        |       |        |
| Crabs, hard            | 129,101   | 3,253   | 34,066    | 520     |        |        |       |        |
| Oysters, market        | 1,612,079 | 214,822 | 1,065,316 | 139,052 |        |        |       |        |
| Oysters, seed          | 236,915   | 9,769   | 256,340   | 10,301  |        |        |       |        |
| Clams, hard            | 853,404   | 86,096  | 834,272   | 84,184  |        |        |       |        |
| Clams, soft            | 42,000    | 2,100   | 40,000    | 2,000   |        |        |       |        |
| Total                  | 2,873,499 | 316,040 | 2,229,994 | 236,057 |        |        |       |        |
| Total vessel and shore | 2,895,939 | 318,385 | 2,254,034 | 238,527 |        |        | 2,912 | 500    |

| Species.               | Union.  |          |         |          | Total for State. |           |            |           |
|------------------------|---------|----------|---------|----------|------------------|-----------|------------|-----------|
|                        | 1897.   |          | 1898.   |          | 1897.            |           | 1898.      |           |
|                        | Lbs.    | Value.   | Lbs.    | Value.   | Lbs.             | Value.    | Lbs.       | Value.    |
| Vessel fisheries:      |         |          |         |          |                  |           |            |           |
| Crabs, hard            |         |          |         |          | 196,334          | \$4,870   | 374,090    | \$9,091   |
| Oysters, market        |         |          |         |          | 4,971,253        | 805,029   | 5,449,815  | 753,166   |
| Oysters, seed          |         |          |         |          | 9,646,245        | 148,127   | 5,467,525  | 235,786   |
| Clams, hard            |         |          |         |          | 791,753          | 95,928    | 741,296    | 90,093    |
| Scallops               |         |          |         |          | 72,000           | 4,000     | 55,800     | 3,100     |
| Mussels                |         |          |         |          |                  |           | 5,000      | 250       |
| Total                  |         |          |         |          | 15,677,585       | 1,057,954 | 12,093,526 | 1,091,486 |
| Shore fisheries:       |         |          |         |          |                  |           |            |           |
| Crabs, hard            |         |          |         |          | 139,101          | 3,403     | 44,066     | 670       |
| Oysters, market        |         |          |         |          | 4,574,108        | 648,340   | 3,944,332  | 556,245   |
| Oysters, seed          | 192,500 | \$11,000 | 525,000 | \$30,000 | 1,843,735        | 80,519    | 2,503,067  | 124,127   |
| Clams, hard            |         |          |         |          | 3,938,424        | 447,867   | 3,753,777  | 434,246   |
| Clams, soft            |         |          |         |          | 745,000          | 63,725    | 795,000    | 66,345    |
| Mussels                |         |          |         |          | 2,520,000        | 1,575     | 2,360,000  | 1,475     |
| Total                  | 192,500 | 11,000   | 525,000 | 30,000   | 13,760,368       | 1,245,429 | 13,400,242 | 1,183,108 |
| Total vessel and shore | 192,500 | 11,000   | 525,000 | 30,000   | 29,437,953       | 2,303,383 | 25,493,768 | 2,274,594 |

Table showing the catch by minor apparatus in New Jersey in 1897 and 1898.

| Species.         | Atlantic. |         |         |         | Burlington. |       |       |       | Cape May. |       |        |       |
|------------------|-----------|---------|---------|---------|-------------|-------|-------|-------|-----------|-------|--------|-------|
|                  | 1897.     |         | 1898.   |         | 1897.       |       | 1898. |       | 1897.     |       | 1898.  |       |
|                  | Lbs.      | Val.    | Lbs.    | Val.    | Lbs.        | Val.  | Lbs.  | Val.  | Lbs.      | Val.  | Lbs.   | Val.  |
| Shore fisheries: |           |         |         |         |             |       |       |       |           |       |        |       |
| Eels.....        | 106,066   | \$4,500 | 100,400 | \$4,265 | .....       | ..... | ..... | ..... | 10,400    | \$544 | 10,000 | \$515 |
| Crabs, hard..... | 80,000    | 2,000   | 80,000  | 2,000   | .....       | ..... | ..... | ..... | .....     | ..... | .....  | ..... |
| Crabs, soft..... | 6,000     | 775     | 6,000   | 775     | .....       | ..... | ..... | ..... | .....     | ..... | .....  | ..... |
| King crabs.....  | .....     | .....   | .....   | .....   | .....       | ..... | ..... | ..... | 50,000    | 213   | 40,000 | 180   |
| Shrimp.....      | 600       | 200     | 600     | 200     | .....       | ..... | ..... | ..... | .....     | ..... | .....  | ..... |
| Terrapin.....    | .....     | .....   | .....   | .....   | 2,431       | \$309 | ..... | ..... | 7,613     | 3,820 | .....  | ..... |
| Turtles.....     | .....     | .....   | .....   | .....   | 400         | 34    | ..... | ..... | 1,500     | 75    | 1,200  | 60    |
| Total.....       | 192,666   | 7,475   | 187,000 | 7,240   | 2,831       | 343   | ..... | ..... | 69,513    | 4,652 | 51,200 | 755   |

| Species.         | Cumberland. |       |         |       | Gloucester. |       |       |       | Monmouth. |         |         |         |
|------------------|-------------|-------|---------|-------|-------------|-------|-------|-------|-----------|---------|---------|---------|
|                  | 1897.       |       | 1898.   |       | 1897.       |       | 1898. |       | 1897.     |         | 1898.   |         |
|                  | Lbs.        | Val.  | Lbs.    | Val.  | Lbs.        | Val.  | Lbs.  | Val.  | Lbs.      | Val.    | Lbs.    | Val.    |
| Shore fisheries: |             |       |         |       |             |       |       |       |           |         |         |         |
| Carp.....        | .....       | ..... | .....   | ..... | 10,400      | \$520 | 2,000 | \$120 | .....     | .....   | .....   | .....   |
| Eels.....        | .....       | ..... | .....   | ..... | .....       | ..... | ..... | ..... | 20,266    | \$1,100 | 22,500  | \$1,620 |
| Crabs, hard..... | .....       | ..... | .....   | ..... | .....       | ..... | ..... | ..... | 18,800    | 564     | 14,000  | 420     |
| Crabs, soft..... | .....       | ..... | .....   | ..... | .....       | ..... | ..... | ..... | 168,000   | 16,175  | 178,000 | 16,600  |
| King crabs.....  | 148,000     | \$370 | 116,000 | \$290 | .....       | ..... | ..... | ..... | .....     | .....   | .....   | .....   |
| Total.....       | 148,000     | 370   | 116,000 | 290   | 10,400      | 520   | 2,000 | 120   | 207,066   | 17,839  | 214,500 | 18,640  |

| Species.         | Ocean. |         |        |         | Salem. |         |        |       | Warren. |       |       |       |
|------------------|--------|---------|--------|---------|--------|---------|--------|-------|---------|-------|-------|-------|
|                  | 1897.  |         | 1898.  |         | 1897.  |         | 1898.  |       | 1897.   |       | 1898. |       |
|                  | Lbs.   | Val.    | Lbs.   | Val.    | Lbs.   | Val.    | Lbs.   | Val.  | Lbs.    | Val.  | Lbs.  | Val.  |
| Shore fisheries: |        |         |        |         |        |         |        |       |         |       |       |       |
| Carp.....        | .....  | .....   | .....  | .....   | 56,300 | \$2,815 | 9,700  | \$582 | .....   | ..... | ..... | ..... |
| Cat-fish.....    | .....  | .....   | .....  | .....   | 1,010  | 51      | 1,465  | 73    | .....   | ..... | ..... | ..... |
| Eels.....        | 25,733 | \$1,145 | 25,333 | \$1,143 | .....  | .....   | .....  | ..... | 5,066   | \$432 | 4,666 | \$384 |
| Crabs, hard..... | 3,866  | 104     | 3,000  | 80      | .....  | .....   | .....  | ..... | .....   | ..... | ..... | ..... |
| Crabs, soft..... | 33,456 | 3,674   | 21,177 | 2,385   | .....  | .....   | .....  | ..... | .....   | ..... | ..... | ..... |
| Shrimp.....      | 2,296  | 1,365   | 2,085  | 1,265   | .....  | .....   | .....  | ..... | .....   | ..... | ..... | ..... |
| Terrapin.....    | 2,197  | 1,231   | .....  | .....   | .....  | .....   | .....  | ..... | .....   | ..... | ..... | ..... |
| Turtles.....     | 1,700  | 164     | 1,700  | 164     | 6,000  | 360     | 5,200  | 312   | .....   | ..... | ..... | ..... |
| Total.....       | 69,248 | 7,683   | 53,295 | 5,037   | 63,310 | 3,226   | 16,365 | 967   | 5,066   | 432   | 4,666 | 384   |

## SUMMARY.

| Species.         | 1897.   |         | 1898.   |        |
|------------------|---------|---------|---------|--------|
|                  | Lbs.    | Value.  | Lbs.    | Value. |
| Shore fisheries: |         |         |         |        |
| Carp.....        | 66,700  | \$3,335 | 11,700  | \$702  |
| Cat-fish.....    | 1,010   | 51      | 1,465   | 73     |
| Eels.....        | 167,531 | 7,721   | 162,899 | 7,927  |
| Crabs, hard..... | 102,666 | 2,668   | 97,000  | 2,500  |
| Crabs, soft..... | 207,456 | 20,624  | 205,177 | 19,760 |
| King crabs.....  | 198,000 | 583     | 156,000 | 470    |
| Shrimp.....      | 2,896   | 1,565   | 2,685   | 1,465  |
| Terrapin.....    | 12,241  | 5,360   | .....   | .....  |
| Turtles.....     | 9,600   | 633     | 8,100   | 536    |
| Total.....       | 768,100 | 42,540  | 645,026 | 33,433 |

## THE MENHADEN INDUSTRY.

New Jersey maintains a small menhaden industry. In 1897 there were 4 factories in operation, valued at \$43,045. These were located as follows: 1 at Leesburg, Cumberland County; 2 at Port Monmouth, Monmouth County; and 1 at Tuckerton, Ocean County. In 1898 there were 6 factories, valued at \$57,995. Their location was the same as in the previous year, the 2 additional factories being in Monmouth County—1 at Keansburg and the other at Port Monmouth. The number of persons employed in 1897 was 53 in the factories and 128 on vessels; and in 1898, 92 in the factories and 112 on vessels. The total amount of the investment, including cash capital, was \$115,038 and \$137,110 each year, respectively.

The number of menhaden caught by the vessels in this fishery in 1897 was 39,709,375, valued at \$55,837; and in 1898, 29,573,550, valued at \$43,093. A large portion of these, together with considerable quantities of menhaden taken by pound nets in the shore fisheries, were pressed at the factories, the remainder of the vessel catch being sold chiefly for bait.

The number of menhaden utilized by the factories in 1897 was 19,279,375, costing \$21,567; and in 1898, 15,907,350, costing \$16,395. The products, consisting of oil and fertilizer, prepared in the former year were valued at \$31,816, and in the latter at \$34,910.

The following table shows in detail the extent of the menhaden industry of this State in 1897 and 1898:

*Table showing the extent of the menhaden industry of New Jersey in 1897 and 1898.*

| Items.   | 1897.      |          | 1898.      |          |
|--|------------|----------|------------|----------|
|  | No.        | Value.   | No.        | Value.   |
| Factories.....                                   | 4          | \$43,045 | 6          | \$57,995 |
| Cash capital.....                                |            | 31,000   |            | 42,500   |
| Wages paid factory employees.....                |            | 7,272    |            | 9,400    |
| Persons in factories.....                        | 53         |          | 92         |          |
| Persons on vessels.....                          | 128        |          | 112        |          |
| Menhaden pressed.....                            | 19,279,375 | 21,567   | 15,907,350 | 16,395   |
| Menhaden caught by vessels.....                  | 39,709,375 | 55,837   | 29,573,550 | 43,093   |
| Tons of dry scrap prepared.....                  | 566        | 12,661   | 745        | 18,173   |
| Tons of acidulated and crude scrap prepared..... | 505        | 5,340    | 193        | 2,028    |
| Gallons of oil made.....                         | 68,510     | 13,815   | 70,165     | 14,709   |
| Steam vessels fishing.....                       | 2          | 12,000   | 2          | 9,000    |
| Tonnage.....                                     | 77         |          | 72         |          |
| Outfit.....                                      |            | 3,971    |            | 3,716    |
| Purse seines.....                                | 3          | 1,500    | 3          | 1,450    |
| Sail vessels fishing.....                        | 7          | 6,400    | 6          | 5,400    |
| Tonnage.....                                     | 163        |          | 136        |          |
| Outfit.....                                      |            | 3,500    |            | 3,300    |
| Purse seines.....                                | 7          | 2,810    | 6          | 2,610    |
| Sail vessels transporting.....                   | 14         | 9,250    | 12         | 9,650    |
| Tonnage.....                                     | 171        |          | 145        |          |
| Outfit.....                                      |            | 1,572    |            | 1,489    |



## THE WHOLESALE FISHERY TRADE.

The wholesale trade in fishery products in New Jersey is of minor consequence, the greater part of the products of all branches of the fisheries being shipped to dealers in New York and Philadelphia. Of the 14 firms handling oysters, clams, and fish at wholesale, 5 are located at Newark, 1 at Elizabethport, 1 at Belford, and 7 at Seaside. The following table exhibits the extent of this trade in 1897 and 1898:

*Table showing the wholesale trade in fishery products of New Jersey in 1897 and 1898.*

| Items.                        | 1897.     |          | 1898.     |          |
|-------------------------------|-----------|----------|-----------|----------|
|                               | No.       | Value.   | No.       | Value.   |
| Establishments .....          | 14        | \$34,025 | 14        | \$34,025 |
| Cash capital .....            |           | 27,200   |           | 27,200   |
| Wages paid .....              |           | 37,020   |           | 37,744   |
| Persons engaged .....         | 96        |          | 96        |          |
|                               | Lbs.      | Value.   | Lbs.      | Value.   |
|                               |           |          |           |          |
| Products sold:                |           |          |           |          |
| Alewives .....                | 13,000    | \$520    | 13,000    | \$520    |
| Blue-fish .....               | 130,000   | 7,800    | 145,000   | 8,700    |
| Bonito .....                  | 4,000     | 320      | 4,000     | 320      |
| Butter-fish .....             | 12,500    | 1,000    | 11,500    | 920      |
| Cisco .....                   | 30,000    | 1,200    | 31,500    | 1,260    |
| Cod .....                     | 347,000   | 17,350   | 355,000   | 17,750   |
| Croakers and spots .....      | 55,000    | 3,300    | 55,000    | 3,300    |
| Cusk .....                    | 3,200     | 96       | 3,500     | 105      |
| Eels .....                    | 38,500    | 3,465    | 48,000    | 4,320    |
| Flounders .....               | 28,500    | 1,140    | 32,000    | 1,280    |
| Haddock, fresh .....          | 36,000    | 1,080    | 44,000    | 1,320    |
| Haddock, smoked .....         | 13,500    | 1,080    | 13,500    | 1,080    |
| Hake .....                    | 7,500     | 300      | 9,500     | 380      |
| Halibut .....                 | 170,000   | 18,700   | 177,000   | 19,470   |
| Herring .....                 | 155,000   | 6,200    | 155,000   | 6,200    |
| Mackerel .....                | 9,000     | 900      | 9,500     | 950      |
| Perch, white and yellow ..... | 4,000     | 280      | 4,000     | 280      |
| Pike and pickerel .....       | 2,400     | 216      | 3,200     | 288      |
| Pollock .....                 | 1,000     | 40       | 1,000     | 40       |
| Pompano .....                 | 800       | 120      | 800       | 120      |
| Red snappers .....            | 7,000     | 700      | 7,000     | 700      |
| Scup .....                    | 392,500   | 19,625   | 425,000   | 21,250   |
| Sea bass .....                | 34,000    | 2,380    | 44,000    | 3,080    |
| Shad .....                    | 487,500   | 39,000   | 525,000   | 42,000   |
| Smelt .....                   | 170,000   | 10,200   | 160,000   | 9,600    |
| Spanish mackerel .....        | 8,500     | 1,275    | 9,500     | 1,425    |
| Squeteague .....              | 149,500   | 5,980    | 156,000   | 6,240    |
| Striped bass .....            | 20,000    | 2,400    | 26,000    | 3,120    |
| White bass .....              | 3,500     | 280      | 4,000     | 320      |
| Crabs, hard .....             | 166,667   | 4,000    | 266,667   | 4,000    |
| Crabs, soft .....             | 26,000    | 4,550    | 26,000    | 4,550    |
| Lobsters .....                | 60,800    | 4,864    | 47,500    | 3,800    |
| Oysters .....                 | 5560,000  | 113,000  | 6469,931  | 96,025   |
| Clams, hard .....             | 7135,000  | 23,850   | 8221,200  | 38,213   |
| Clams, soft .....             | 9115,800  | 9,580    | 10156,800 | 13,820   |
| Clams, soft, opened .....     | 11900,000 | 56,250   | 12889,000 | 55,000   |
| Total .....                   | 4,197,667 | 363,041  | 4,340,598 | 371,746  |

<sup>1</sup>200,000 in number.

<sup>4</sup>78,000 in number.

<sup>7</sup>16,875 bushels.

<sup>10</sup>15,680 bushels.

<sup>2</sup>200,000 in number.

<sup>5</sup>80,000 bushels.

<sup>8</sup>27,650 bushels.

<sup>11</sup>90,000 bushels.

<sup>3</sup>78,000 in number.

<sup>6</sup>67,133 bushels.

<sup>9</sup>11,580 bushels.

<sup>12</sup>88,000 bushels.

FISHERIES OF PENNSYLVANIA.

Pennsylvania is the only State in the Middle Atlantic region which has no frontage on the ocean. By means of a small fleet of vessels, however, there is carried on a line fishery for salt-water species in the ocean, and also a large fishery for oysters in Delaware Bay. The principal other coast fisheries of the State are those of the Delaware and Susquehanna rivers. The statistics here presented relate to coast fisheries and therefore do not cover that part of the State bordering on Lake Erie, nor the Susquehanna River and tributaries above York and Lancaster counties, though since the break in the dam at Columbia shad have ascended the Susquehanna River as far as Duncannon and the Juniata River as far as Newport.

The most important fisheries are those with seines and gill nets for shad on the Delaware and Susquehanna rivers and the vessel fishery for oysters in Delaware Bay. A considerable part of the oyster industry of New Jersey and Delaware and some of the largest seine fisheries in New Jersey are controlled in Pennsylvania.

The number of persons engaged in the coast fisheries of the State was 1,898, of whom 318 were on vessels fishing and transporting, 1,143 in the shore fisheries, and 437 were shoresmen. The number of vessels fishing and transporting fishery products was 40, having a value, with their outfits, of \$91,755; the number of the boats in the shore fisheries was 504, valued at \$21,485; the apparatus of capture used on vessels was valued at \$2,591, and on boats, \$25,021; the value of the shore and accessory property was \$828,576, and the amount of cash capital utilized, \$632,100; a total investment, including the cash capital, of \$1,601,528.

The products of the fisheries comprised 3,740,801 pounds of fish, having a value of \$125,341; 265,934 bushels of oysters, valued at \$143,974; and 1,924 pounds of terrapins, turtles, and frogs, worth \$192; the total value of products being \$269,507.

The three tables which follow show in detail the extent of the coast fisheries of Pennsylvania in 1897:

Table of persons employed.

| How engaged.                      | No.   |
|-----------------------------------|-------|
| On vessels fishing .....          | 302   |
| On vessels transporting .....     | 16    |
| On boats in shore fisheries ..... | 1,143 |
| Shoresmen .....                   | 437   |
| Total .....                       | 1,898 |

*Table of apparatus and capital.*

| Items.                      | No. | Value.   | Items.                                   | No.   | Value.    |
|-----------------------------|-----|----------|--|-------|-----------|
| Vessels fishing.....        | 36  | \$62,800 | Apparatus—shore fisheries:               |       |           |
| Tonnage.....                | 639 |          | Seines (total length 23,617 yards)...    | 125   | \$12,921  |
| Outfit.....                 |     | 19,690   | Gill nets (total length 65,337 yards)... | 177   | 9,711     |
| Vessels transporting.....   | 4   | 8,400    | Fyke nets.....                           | 1,120 | 1,508     |
| Tonnage.....                | 118 |          | Lines.....                               |       | 81        |
| Outfit.....                 |     | 865      | Eel pots.....                            | 125   | 90        |
| Boats.....                  | 504 | 21,485   | Dip nets.....                            | 110   | 320       |
| Apparatus—vessel fisheries: |     |          | Other apparatus.....                     |       | 390       |
| Lines.....                  |     | 91       | Shore and accessory property.....        |       | 828,576   |
| Dredges.....                | 83  | 2,500    | Cash capital.....                        |       | 632,100   |
|                             |     |          | Total.....                               |       | 1,601,528 |

*Table of products.*

| Species.              | Lbs.      | Value.  | Species.            | Lbs.       | Value.  |
|-----------------------|-----------|---------|---------------------|------------|---------|
| Alewives, fresh.....  | 143,503   | \$1,297 | Striped bass.....   | 9,556      | \$991   |
| Alewives, salted..... | 278,832   | 1,586   | Sturgeon.....       | 9,945      | 260     |
| Black bass.....       | 4,103     | 418     | Suckers.....        | 25,250     | 1,244   |
| Blue-fish.....        | 12,800    | 321     | Sun-fish.....       | 1,010      | 26      |
| Carp.....             | 114,950   | 6,695   | Wall-eyed pike..... | 528        | 66      |
| Cat-fish.....         | 120,096   | 6,985   | Oysters.....        | *1,861,538 | 143,974 |
| Eels.....             | 51,794    | 4,273   | Terrapins.....      | 825        | 98      |
| Flounders.....        | 31,545    | 792     | Turtles.....        | 1,021      | 78      |
| Salmon.....           | 414       | 81      | Frogs.....          | 78         | 16      |
| Scup.....             | 29,150    | 719     |                     |            |         |
| Sea bass.....         | 900,000   | 36,000  | Total.....          | 5,604,263  | 269,507 |
| Shad.....             | 2,007,325 | 63,587  |                     |            |         |

\* Represents 265,934 bushels.

## THE FISHERIES BY COUNTIES.

There are eight counties in the eastern part of Pennsylvania which maintain fisheries: Lancaster and York counties on the Susquehanna River, and Pike, Monroe, Northampton, Bucks, Philadelphia, and Delaware counties on the Delaware River. In the counties on the Susquehanna River 346 persons were employed; the investment was \$8,610, and the products, principally shad, were valued at \$15,872; while in the counties bordering on the Delaware River 1,552 persons were employed, \$1,592,918 invested, and the products were valued at \$253,635. The species in the counties on the Delaware River having the greatest value were sea bass, shad, and oysters.

The fisheries of Philadelphia County are the most extensive. They gave employment to 952 persons, a larger number than were employed in all the other counties combined. The amount of capital invested was \$1,499,948, and the products aggregated 3,443,772 pounds, valued at \$200,776. The whole of the vessel fisheries of this section of the State and a considerable part of the shore fisheries are centered in this county. The large investment, as compared with other counties, is due chiefly to the extensive wholesale trade of the city of Philadelphia.

The fisheries of Bucks County are next in importance. The number of persons employed was 378, the investment was \$65,655, and the

products amounted to 1,313,388 pounds, valued at \$37,349. The species taken in greatest quantity and value were shad and alewives.

The relative importance of the fisheries of each county in 1897 is exhibited in the three following tables:

*Table showing, by counties, the number of persons employed in the fisheries of Pennsylvania in 1897.*

| Counties.          | In vessel fisheries. | On ves- sels trans- porting. | In shore or boat fisheries. | Shores- men. | Total. |
|--------------------|----------------------|------------------------------|-----------------------------|--------------|--------|
| Bucks .....        |                      |                              | 361                         | 17           | 378    |
| Delaware .....     |                      |                              | 134                         | 24           | 158    |
| Lancaster .....    |                      |                              | 191                         |              | 191    |
| Monroe .....       |                      |                              | 21                          |              | 21     |
| Northampton .....  |                      |                              | 20                          |              | 20     |
| Philadelphia ..... | 302                  | 16                           | 238                         | 396          | 952    |
| Pike .....         |                      |                              | 23                          |              | 23     |
| York .....         |                      |                              | 155                         |              | 155    |
| Total .....        | 302                  | 16                           | 1,143                       | 437          | 1,898  |

*Table showing, by counties, the vessels, boats, apparatus, and shore property employed in the fisheries of Pennsylvania in 1897.*

| Items.                             | Bucks. |         | Delaware. |         | Lancaster. |         | Monroe. |        | North- ampton. |        |
|------------------------------------|--------|---------|-----------|---------|------------|---------|---------|--------|----------------|--------|
|                                    | No.    | Value.  | No.       | Value.  | No.        | Value.  | No.     | Value. | No.            | Value. |
| Boats .....                        | 137    | \$5,566 | 72        | \$5,990 | 94         | \$2,080 | 4       | \$70   | 4              | \$76   |
| Apparatus—shore fisheries:         |        |         |           |         |            |         |         |        |                |        |
| Seines .....                       | 42     | 7,051   | 7         | 940     | 25         | 1,320   | 4       | 170    | 4              | 235    |
| Gill nets .....                    | 42     | 1,425   | 64        | 5,999   |            |         |         |        |                |        |
| Fyke nets .....                    |        |         | 175       | 175     | 18         | 18      |         |        |                |        |
| Lines .....                        |        | 12      |           | 10      |            | 51      |         |        |                |        |
| Eel pots .....                     |        |         | 55        | 55      |            |         |         |        |                |        |
| Dip nets .....                     |        |         |           |         | 75         | 204     |         |        |                |        |
| Other apparatus .....              |        |         |           |         |            | 180     |         |        |                |        |
| Shore and accessory property ..... |        | 51,601  |           | 8,400   |            | 1,515   |         | 500    |                | 360    |
| Cash capital .....                 |        |         |           | 3,200   |            |         |         |        |                |        |
| Total .....                        |        | 65,655  |           | 24,769  |            | 5,368   |         | 740    |                | 671    |

| Items.                             | Philadelphia. |           | Pike. |        | York. |        | Total. |           |
|------------------------------------|---------------|-----------|-------|--------|-------|--------|--------|-----------|
|                                    | No.           | Value.    | No.   | Value. | No.   | Value. | No.    | Value.    |
| Vessels fishing .....              | 36            | \$62,800  |       |        |       |        | 36     | \$62,800  |
| Tonnage .....                      | 639           |           |       |        |       |        | 639    |           |
| Outfit .....                       |               | 19,690    |       |        |       |        |        | 19,690    |
| Vessels transporting .....         | 4             | 8,400     |       |        |       |        | 4      | 8,400     |
| Tonnage .....                      | 118           |           |       |        |       |        | 118    |           |
| Outfit .....                       |               | 865       |       |        |       |        |        | 865       |
| Boats .....                        | 108           | 6,670     | 5     | \$100  | 80    | \$933  | 504    | 21,485    |
| Apparatus—vessel fisheries:        |               |           |       |        |       |        |        |           |
| Dredges .....                      | 83            | 2,500     |       |        |       |        | 83     | 2,500     |
| Lines .....                        |               | 91        |       |        |       |        |        | 91        |
| Apparatus—shore fisheries:         |               |           |       |        |       |        |        |           |
| Seines .....                       | 19            | 2,050     | 5     | 250    | 19    | 905    | 125    | 12,921    |
| Gill nets .....                    | 71            | 2,287     |       |        |       |        | 177    | 9,711     |
| Fyke nets .....                    | 892           | 1,278     |       |        | 35    |        | 1,120  | 1,508     |
| Lines .....                        |               |           |       |        |       | 8      |        | 81        |
| Eel pots .....                     | 70            | 35        |       |        |       |        | 125    | 90        |
| Dip nets .....                     | 7             | 32        |       |        | 28    | 84     | 110    | 320       |
| Other apparatus .....              |               |           |       |        |       | 210    |        | 390       |
| Shore and accessory property ..... |               | 764,350   |       | 785    |       | 1,065  |        | 828,576   |
| Cash capital .....                 |               | 628,900   |       |        |       |        |        | 632,100   |
| Total .....                        |               | 1,499,948 |       | 1,135  |       | 3,242  |        | 1,601,528 |

Table showing, by counties and species, the yield of the fisheries of Pennsylvania in 1897.

| Species.         | Bucks.    |        | Delaware. |        | Lancaster. |        | Monroe. |         | Northampton. |        |
|------------------|-----------|--------|-----------|--------|------------|--------|---------|---------|--------------|--------|
|                  | Lbs.      | Value. | Lbs.      | Value. | Lbs.       | Value. | Lbs.    | Value.  | Lbs.         | Value. |
| Alewives, fresh  | 91,670    | \$755  | 29,500    | \$383  |            |        |         |         |              |        |
| Alewives, salted | 278,832   | 1,586  |           |        |            |        |         |         |              |        |
| Black bass       | 100       | 13     |           |        | 3,265      | \$330  |         |         |              |        |
| Carp             | 27,655    | 1,399  | 18,075    | 1,103  | 12,000     | 520    |         |         |              |        |
| Cat-fish         | 8,930     | 451    | 9,600     | 632    | 14,507     | 1,040  |         |         |              |        |
| Eels             | 1,130     | 113    | 7,000     | 502    | 11,711     | 910    |         |         |              |        |
| Salmon           | 354       | 68     | 36        | 8      |            |        |         |         |              |        |
| Shad             | 883,535   | 31,733 | 445,690   | 9,063  | 151,532    | 8,178  | 17,400  | \$1,150 | 7,640        | \$529  |
| Striped bass     | 1,786     | 168    | 5,170     | 515    | 200        | 20     |         |         |              |        |
| Sturgeon         | 985       | 53     | 8,960     | 207    |            |        |         |         |              |        |
| Suckers          | 17,400    | 939    |           |        | 4,900      | 182    |         |         |              |        |
| Sun-fish         | 110       | 5      |           |        | 100        | 5      |         |         |              |        |
| Wall-eyed pike   |           |        |           |        | 528        | 66     |         |         |              |        |
| Terrapins        |           |        |           |        | 825        | 98     |         |         |              |        |
| Turtles          | 901       | 66     |           |        | 120        | 12     |         |         |              |        |
| Frogs            |           |        |           |        | 42         | 7      |         |         |              |        |
| Total            | 1,313,388 | 37,349 | 524,031   | 12,413 | 199,730    | 11,368 | 17,400  | 1,150   | 7,640        | 529    |

| Species.         | Philadelphia. |         | Pike.  |         | York.  |        | Total.    |         |
|------------------|---------------|---------|--------|---------|--------|--------|-----------|---------|
|                  | Lbs.          | Value.  | Lbs.   | Value.  | Lbs.   | Value. | Lbs.      | Value.  |
| Alewives, fresh  | 22,333        | \$159   |        |         |        |        | 143,503   | \$1,297 |
| Alewives, salted |               |         |        |         |        |        | 278,832   | 1,586   |
| Black bass       |               |         |        |         | 788    | \$75   | 4,103     | 418     |
| Blue-fish        | 12,800        | 321     |        |         |        |        | 12,800    | 321     |
| Carp             | 56,370        | 3,631   |        |         | 850    | 42     | 114,950   | 6,695   |
| Cat-fish         | 82,637        | 4,498   |        |         | 4,422  | 364    | 120,096   | 6,985   |
| Eels             | 17,475        | 1,562   |        |         | 14,478 | 1,186  | 51,794    | 4,273   |
| Flounders        | 31,545        | 792     |        |         |        |        | 31,545    | 792     |
| Salmon           | 24            | 5       |        |         |        |        | 414       | 81      |
| Scup             | 29,150        | 719     |        |         |        |        | 29,150    | 719     |
| Sea bass         | 900,000       | 36,000  |        |         |        |        | 900,000   | 36,000  |
| Shad             | 425,400       | 8,741   | 24,960 | \$1,418 | 51,168 | 2,775  | 2,007,325 | 63,587  |
| Striped bass     | 2,400         | 288     |        |         |        |        | 9,556     | 991     |
| Sturgeon         |               |         |        |         |        |        | 9,945     | 260     |
| Suckers          | 1,300         | 70      |        |         | 1,650  | 53     | 25,250    | 1,244   |
| Sun-fish         | 800           | 16      |        |         |        |        | 1,010     | 26      |
| Wall-eyed pike   |               |         |        |         |        |        | 528       | 66      |
| Oysters          | 1,861,538     | 143,974 |        |         |        |        | 1,861,538 | 143,974 |
| Terrapins        |               |         |        |         |        |        | 825       | 98      |
| Turtles          |               |         |        |         |        |        | 1,021     | 78      |
| Frogs            |               |         |        |         | 36     | 9      | 78        | 16      |
| Total            | 3,443,772     | 200,776 | 24,960 | 1,418   | 73,342 | 4,504  | 5,604,263 | 269,507 |

#### THE CATCH OF SHAD.

The following supplementary table shows in number, instead of pounds, the catch of shad, and the value, in each county of Pennsylvania on the Delaware and Susquehanna rivers in 1897:

| Counties.    | No.       | Value.   |
|--------------|-----------|----------|
| Bucks        | 220,884   | \$31,733 |
| Delaware     | 111,423   | 9,063    |
| Lancaster    | 37,883    | 8,178    |
| Monroe       | 4,350     | 1,150    |
| Northampton  | 1,910     | 529      |
| Philadelphia | 106,350   | 8,741    |
| Pike         | 6,240     | 1,418    |
| York         | 12,792    | 2,775    |
| Total        | * 501,832 | 63,587   |

\* 2,007,325 pounds.

## THE FISHERIES, BY APPARATUS.

In the vessel fisheries lines and oyster dredges are the only apparatus of capture. The principal species in the line fishery are sea bass and flounders. This fishery is prosecuted in the ocean during the summer months by vessels which are engaged in the oyster fishery or the coasting trade the rest of the year. The line catch amounted to 973,495 pounds, valued at \$37,832. The oyster fishery is carried on entirely in the waters of New Jersey and Delaware, principally the latter, where most of the planted beds owned directly by Pennsylvanians are located. The catch of oysters amounted to 1,861,538 pounds, or 265,934 bushels, valued at \$143,974. The total catch in the vessel fisheries was 2,835,033 pounds, valued at \$181,806.

In the shore fisheries seines are the most important apparatus employed. The quantity of products taken by them was 1,479,834 pounds, valued at \$50,177, the principal species being shad and alewives. This is the oldest method of fishing on the Delaware River, and some of these seine fisheries have been in operation since before the beginning of the present century. The yield of gill nets was 1,065,581 pounds, valued at \$23,522, more shad being taken in them than in any other form of apparatus. Fyke nets and dip nets produced respectively 86,117 pounds, valued at \$5,429, and 82,713 pounds, valued at \$4,247. Lines, pots, and minor apparatus secured 2,769,230 pounds, valued at \$87,701.

The two tables which follow show the quantity and value of products in the vessel and shore fisheries by each form of apparatus:

*Table showing the yield of the vessel fisheries of Pennsylvania in 1897.*

| Apparatus and species.   | Philadelphia County. |                |
|--------------------------|----------------------|----------------|
|                          | Lbs.                 | Value.         |
| <b>Lines:</b>            |                      |                |
| Blue-fish .....          | 12,800               | \$321          |
| Flounders .....          | 31,545               | 792            |
| Scup .....               | 29,150               | 719            |
| Sea bass .....           | 900,000              | 36,000         |
| <b>Total</b> .....       | <b>973,495</b>       | <b>37,832</b>  |
| <b>Dredges:</b>          |                      |                |
| Oysters .....            | 1,861,538            | 143,974        |
| <b>Grand total</b> ..... | <b>2,835,033</b>     | <b>181,806</b> |



# 260 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties and apparatus of capture, the yield of the shore fisheries of Pennsylvania in 1897.

| Species.               | Bucks.    |        | Delaware. |        | Lancaster. |        | Philadelphia. |        |
|------------------------|-----------|--------|-----------|--------|------------|--------|---------------|--------|
|                        | Lbs.      | Value. | Lbs.      | Value. | Lbs.       | Value. | Lbs.          | Value. |
| Seines:                |           |        |           |        |            |        |               |        |
| Alewives, fresh .....  | 91,670    | \$755  | 500       | \$8    |            |        | 18,667        | \$137  |
| Alewives, salted ..... | 278,832   | 1,586  |           |        |            |        |               |        |
| Carp .....             | 27,655    | 1,399  | 18,075    | 1,103  | 12,000     | \$520  | 55,160        | 3,510  |
| Cat-fish .....         | 7,600     | 380    | 300       | 15     |            |        | 27,100        | 1,526  |
| Eels .....             |           |        |           |        |            |        | 3,900         | 252    |
| Salmon .....           | 314       | 63     |           |        |            |        |               |        |
| Shad .....             | 694,440   | 26,112 | 240       | 6      | 83,932     | 4,778  | 41,200        | 1,030  |
| Striped bass .....     | 1,786     | 168    | 60        | 4      |            |        | 2,400         | 288    |
| Sturgeon .....         | 985       | 53     |           |        |            |        |               |        |
| Suckers .....          | 17,400    | 939    |           |        | 4,000      | 155    | 1,300         | 70     |
| Sun-fish .....         |           |        |           |        |            |        | 800           | 16     |
| Wall-eyed pike .....   |           |        |           |        | 100        | 12     |               |        |
| Total .....            | 1,120,682 | 31,455 | 19,175    | 1,136  | 100,032    | 5,465  | 150,527       | 6,829  |
| Gill nets:             |           |        |           |        |            |        |               |        |
| Alewives .....         |           |        | 29,000    | 375    |            |        | 3,666         | 22     |
| Salmon .....           | 40        | 5      | 36        | 8      |            |        | 24            | 5      |
| Shad .....             | 189,095   | 5,621  | 445,450   | 9,057  |            |        | 384,200       | 7,711  |
| Striped bass .....     |           |        | 5,110     | 511    |            |        |               |        |
| Sturgeon .....         |           |        | 8,960     | 207    |            |        |               |        |
| Total .....            | 189,135   | 5,626  | 488,556   | 10,158 |            |        | 387,890       | 7,738  |
| Fyke nets:             |           |        |           |        |            |        |               |        |
| Cat-fish .....         |           |        | 8,800     | 592    | 10,000     | 700    | 54,737        | 2,932  |
| Eels .....             |           |        | 300       | 24     |            |        | 10,630        | 1,015  |
| Total .....            |           |        | 9,100     | 616    | 10,000     | 700    | 65,367        | 3,947  |
| Dip nets:              |           |        |           |        |            |        |               |        |
| Carp .....             |           |        |           |        |            |        | 1,210         | 121    |
| Cat-fish .....         |           |        |           |        |            |        | 800           | 40     |
| Shad .....             |           |        |           |        | 67,600     | 3,400  |               |        |
| Terrapins .....        |           |        |           |        | 225        | 38     |               |        |
| Frogs .....            |           |        |           |        | 42         | 7      |               |        |
| Total .....            |           |        |           |        | 67,867     | 3,445  | 2,010         | 161    |
| Lines:                 |           |        |           |        |            |        |               |        |
| Black bass .....       | 100       | 13     |           |        | 3,265      | 330    |               |        |
| Cat-fish .....         | 1,330     | 71     | 500       | 25     | 2,007      | 160    |               |        |
| Eels .....             | 1,130     | 113    | 900       | 72     | 1,211      | 110    |               |        |
| Striped bass .....     |           |        |           |        | 200        | 20     |               |        |
| Sun-fish .....         | 110       | 5      |           |        | 100        | 5      |               |        |
| Wall-eyed pike .....   |           |        |           |        | 428        | 54     |               |        |
| Terrapins .....        |           |        |           |        | 600        | 60     |               |        |
| Turtles .....          | 901       | 66     |           |        | 120        | 12     |               |        |
| Total .....            | 3,571     | 268    | 1,400     | 97     | 7,931      | 751    |               |        |
| Pots:                  |           |        |           |        |            |        |               |        |
| Eels .....             |           |        | 5,800     | 406    |            |        | 2,945         | 295    |
| Other apparatus:       |           |        |           |        |            |        |               |        |
| Cat-fish .....         |           |        |           |        | 2,500      | 180    |               |        |
| Eels .....             |           |        |           |        | 10,500     | 800    |               |        |
| Suckers .....          |           |        |           |        | 900        | 27     |               |        |
| Total .....            |           |        |           |        | 13,900     | 1,007  |               |        |
| Grand total .....      | 1,313,388 | 37,349 | 524,031   | 12,413 | 199,730    | 11,368 | 608,739       | 18,970 |

Table showing, by counties and apparatus of capture, the yield of the shore fisheries of Pennsylvania in 1897—Continued.

| Species.                 | Monroe. |         | Northampton. |        | Pike.  |         | York.  |        |
|--------------------------|---------|---------|--------------|--------|--------|---------|--------|--------|
|                          | Lbs.    | Value.  | Lbs.         | Value. | Lbs.   | Value.  | Lbs.   | Value. |
| <b>Seines:</b>           |         |         |              |        |        |         |        |        |
| Carp .....               |         |         |              |        |        |         | 850    | \$42   |
| Shad .....               | 17,400  | \$1,150 | 7,640        | \$529  | 24,960 | \$1,418 | 38,368 | 2,143  |
| Suckers .....            |         |         |              |        |        |         | 200    | 10     |
| <b>Total</b> .....       | 17,400  | 1,150   | 7,640        | 529    | 24,960 | 1,418   | 39,418 | 2,195  |
| <b>Fyke nets:</b>        |         |         |              |        |        |         |        |        |
| Cat-fish .....           |         |         |              |        |        |         | 800    | 96     |
| Eels .....               |         |         |              |        |        |         | 700    | 66     |
| Suckers .....            |         |         |              |        |        |         | 150    | 4      |
| <b>Total</b> .....       |         |         |              |        |        |         | 1,650  | 166    |
| <b>Dip nets:</b>         |         |         |              |        |        |         |        |        |
| Shad .....               |         |         |              |        |        |         | 12,800 | 632    |
| Frogs .....              |         |         |              |        |        |         | 36     | 9      |
| <b>Total</b> .....       |         |         |              |        |        |         | 12,836 | 641    |
| <b>Lines:</b>            |         |         |              |        |        |         |        |        |
| Black bass .....         |         |         |              |        |        |         | 738    | 75     |
| Cat-fish .....           |         |         |              |        |        |         | 622    | 48     |
| Eels .....               |         |         |              |        |        |         | 2,778  | 300    |
| <b>Total</b> .....       |         |         |              |        |        |         | 4,138  | 423    |
| <b>Other apparatus:</b>  |         |         |              |        |        |         |        |        |
| Cat-fish .....           |         |         |              |        |        |         | 3,000  | 220    |
| Eels .....               |         |         |              |        |        |         | 11,000 | 820    |
| Suckers .....            |         |         |              |        |        |         | 1,300  | 39     |
| <b>Total</b> .....       |         |         |              |        |        |         | 15,300 | 1,079  |
| <b>Grand total</b> ..... | 17,400  | 1,150   | 7,640        | 529    | 24,960 | 1,418   | 73,342 | 4,504  |

## SUMMARY.

| Species.               | Pounds.   | Value. | Species.                 | Pounds.   | Value. |
|------------------------|-----------|--------|--------------------------|-----------|--------|
| <b>Seines:</b>         |           |        | <b>Dip nets:</b>         |           |        |
| Alewives, fresh .....  | 110,837   | \$900  | Carp .....               | 1,210     | \$121  |
| Alewives, salted ..... | 278,832   | 1,586  | Cat-fish .....           | 800       | 40     |
| Carp .....             | 113,740   | 6,574  | Shad .....               | 80,400    | 4,032  |
| Cat-fish .....         | 35,000    | 1,921  | Terrapins .....          | 225       | 38     |
| Eels .....             | 3,900     | 252    | Frogs .....              | 78        | 16     |
| Salmon .....           | 314       | 63     | <b>Total</b> .....       | 82,713    | 4,247  |
| Shad .....             | 908,180   | 37,166 | <b>Lines:</b>            |           |        |
| Striped bass .....     | 4,246     | 460    | Black bass .....         | 4,103     | 418    |
| Sturgeon .....         | 985       | 53     | Cat-fish .....           | 4,459     | 304    |
| Suckers .....          | 22,900    | 1,174  | Eels .....               | 6,019     | 595    |
| Sun-fish .....         | 800       | 16     | Striped bass .....       | 200       | 20     |
| Wall-eyed pike .....   | 100       | 12     | Sun-fish .....           | 210       | 10     |
| <b>Total</b> .....     | 1,479,834 | 50,177 | Wall-eyed pike .....     | 428       | 54     |
| <b>Gill nets:</b>      |           |        | Terrapins .....          | 600       | 60     |
| Alewives .....         | 32,666    | 397    | Turtles .....            | 1,021     | 78     |
| Salmon .....           | 100       | 18     | <b>Total</b> .....       | 17,040    | 1,539  |
| Shad .....             | 1,018,745 | 22,389 | <b>Pots:</b>             |           |        |
| Striped bass .....     | 5,110     | 511    | Eels .....               | 8,745     | 701    |
| Sturgeon .....         | 8,960     | 207    | <b>Other apparatus:</b>  |           |        |
| <b>Total</b> .....     | 1,065,581 | 23,522 | Cat-fish .....           | 5,500     | 400    |
| <b>Fyke nets:</b>      |           |        | Eels .....               | 21,500    | 1,620  |
| Cat-fish .....         | 74,337    | 4,320  | Suckers .....            | 2,200     | 66     |
| Eels .....             | 11,630    | 1,105  | <b>Total</b> .....       | 29,200    | 2,086  |
| Suckers .....          | 150       | 4      | <b>Grand total</b> ..... | 2,769,230 | 87,701 |
| <b>Total</b> .....     | 86,117    | 5,429  |                          |           |        |

## THE WHOLESALE FISHERY TRADE OF PHILADELPHIA AND CHESTER.

The wholesale fish and oyster dealers of Philadelphia handle a great part of the fishery products taken on the Delaware River and Bay, and also considerable quantities from other sections of the country. Since 1897, the year covered by the present investigation, a large wholesale fresh-fish market has been built, taking the place of the former small market. The trade in oysters and fresh, salted, and smoked fish is extensive. Among the fresh-water species there is a large quantity of carp. There were 76 firms in the wholesale trade of Philadelphia, in which 396 persons were employed, and the investment, including cash capital, but exclusive of wages, amounted to \$1,391,601. The products were valued at \$3,937,686.

At Chester there were six wholesale firms, having 24 persons engaged, and an investment of \$11,050. The products, consisting largely of shad, were valued at \$60,046.

The extent of the wholesale fishery trade of Philadelphia and Chester in 1897 is presented in the following table:

*Table showing the extent of the wholesale trade in fishery products of Philadelphia and Chester, Pa., in 1897.*

| Items.  | Philadelphia. |           | Chester.  |         | Total.     |           |
|---|---------------|-----------|-----------|---------|------------|-----------|
|   | No.           | Value.    | No.       | Value.  | No.        | Value.    |
| Establishments .....                            | 76            | \$762,701 | 6         | \$7,850 | 82         | \$770,551 |
| Cash capital .....                              |               | 628,900   |           | 3,200   |            | 632,100   |
| Wages paid .....                                |               | 137,295   |           | 1,478   |            | 138,773   |
| Persons engaged.....                            | 396           |           | 24        |         | 420        |           |
| <i>Products handled.</i>                        |               |           |           |         |            |           |
| Oysters opened .....gallons..                   | 60,001        | 51,500    |           |         | 60,001     | 51,500    |
| Oysters in shell .....bushels..                 | 938,111       | 1,084,172 | 12,450    | 18,390  | 950,561    | 1,102,562 |
| Clams.....number..                              | 36,232,000    | 90,580    | 160,000   | 560     | 36,392,000 | 91,140    |
| Lobsters.....pounds..                           | 130,000       | 19,950    |           |         | 130,000    | 19,950    |
| Crabs.....number..                              | 701,090       | 7,517     |           |         | 701,090    | 7,517     |
| Crab meat.....gallons..                         | 5,000         | 5,000     |           |         | 5,000      | 5,000     |
| Salmon, canned.....cases..                      | 22,000        | 99,000    |           |         | 22,000     | 99,000    |
| Terrapin.....number..                           | 6,260         | 13,244    |           |         | 6,260      | 13,244    |
| Fish, fresh.....pounds..                        | 35,095,901    | 1,418,248 | 1,693,993 | 41,046  | 36,789,894 | 1,459,294 |
| Fish, dried, salted, and smoked,<br>pounds..... | 18,901,820    | 1,148,475 |           |         | 18,901,820 | 1,148,475 |
| Caviar.....pounds..                             |               |           | 130       | 50      | 130        | 50        |
| Value of products.....                          |               | 3,937,686 |           | 60,046  |            | 3,997,732 |

## FISHERIES OF DELAWARE.

The fisheries of this State are prosecuted in the Delaware River and Bay and the Atlantic Ocean, and to a small extent in the Nanticoke River, a tributary of Chesapeake Bay.

The number of persons engaged in the fisheries in 1897 was 2,392, of whom 120 were on fishing and transporting vessels; 1,888 on boats in the shore fisheries, and 384 in fishery industries on shore.

The number of vessels fishing and transporting was 42, valued with their outfits at \$37,854. The number of boats in the shore fisheries was 953, valued at \$39,349.

The value of apparatus connected with the vessel fisheries, consisting almost entirely of oyster dredges, was \$2,886, while in the shore fisheries numerous forms of apparatus were employed having an aggregate value of \$43,156. The more important of these were gill nets, valued at \$31,037; seines, \$8,676; fyke nets, \$1,125; and pound nets, \$625. The value of shore property and cash capital amounted to \$284,574, the total investment being \$407,819.

The products of the fisheries aggregated 8,647,897 pounds, worth \$252,123. The most important species in value were shad, worth \$47,962; squeteague, \$25,149; perch, \$19,128; striped bass, \$12,033; and alewives, \$11,910. The yield of the oyster fishery was valued at \$63,897, and of the sturgeon fishery \$34,750. Of the latter amount, \$25,736 represents the value of the caviar.

The three tables which follow show by counties the number and value of vessels, boats, and fishing apparatus, the number of persons employed; the value of the shore and accessory property, the amount of cash capital, and the quantity and value of the products of the fisheries of Delaware in the year 1897:

*Table showing, by counties, the vessels, boats, apparatus, and shore property employed in the fisheries of Delaware in 1897.*

| Items.                                       | Kent. |          | Newcastle. |         | Sussex. |         | Total. |          |
|--|-------|----------|------------|---------|---------|---------|--------|----------|
|  | No.   | Value.   | No.        | Value.  | No.     | Value.  | No.    | Value.   |
| Vessels fishing .....                        | 24    | \$20,625 |            |         |         |         | 24     | \$20,625 |
| Tonnage .....                                | 211   |          |            |         |         |         | 211    |          |
| Outfit .....                                 |       | 3,900    |            |         |         |         |        | 3,900    |
| Vessels transporting .....                   | 3     | 1,650    | 5          | \$4,300 | 10      | \$5,800 | 18     | 11,750   |
| Tonnage .....                                | 55    |          | 110        |         | 178     |         | 343    |          |
| Outfit .....                                 |       | 50       |            | 265     |         | 1,264   |        | 1,579    |
| Boats .....                                  | 320   | 11,145   | 272        | 23,209  | 361     | 4,995   | 953    | 39,349   |
| Apparatus—vessel fisheries:                  |       |          |            |         |         |         |        |          |
| Dredges .....                                | 72    | 2,880    |            |         |         |         | 72     | 2,880    |
| Lines .....                                  |       | 6        |            |         |         |         |        | 6        |
| Apparatus—shore fisheries:                   |       |          |            |         |         |         |        |          |
| Pound nets .....                             |       |          | 4          | 150     | 4       | 475     | 8      | 625      |
| Seines (total length 22,101 yards) .....     | 41    | 2,330    | 23         | 1,378   | 112     | 4,968   | 176    | 8,676    |
| Gill nets (total length 246,345 yards) ..... | 226   | 6,691    | 242        | 20,742  | 515     | 3,604   | 983    | 31,037   |
| Fyke nets .....                              | 260   | 305      | 170        | 261     | 226     | 559     | 656    | 1,125    |
| Minor nets .....                             | 54    | 180      | 1          | 2       | 98      | 121     | 153    | 303      |
| Lines .....                                  |       | 17       |            | 41      |         | 37      |        | 95       |
| Eel pots and spears .....                    | 72    | 18       | 50         | 45      | 558     | 196     | 680    | 259      |
| Lobster pots .....                           |       |          |            |         | 100     | 100     | 100    | 100      |
| Tongs .....                                  | 95    | 682      |            |         | 22      | 163     | 117    | 845      |
| Other apparatus .....                        |       | 7        |            | 27      |         | 57      |        | 91       |
| Shore and accessory property .....           |       | 9,835    |            | 19,694  |         | 166,845 |        | 196,374  |
| Cash capital .....                           |       | 1,500    |            | 4,200   |         | 82,500  |        | 88,200   |
| Total .....                                  |       | 61,821   |            | 74,314  |         | 271,684 |        | 407,819  |

Table showing, by counties, the number of persons employed in the fisheries of Delaware in 1897.

| Items.                            | Kent. | Newcastle. | Sussex. | Total. |
|-----------------------------------|-------|------------|---------|--------|
| On vessels fishing.....           | 87    |            |         | 87     |
| On vessels transporting.....      |       | 10         | 23      | 33     |
| On boats, in shore fisheries..... | 576   | 496        | 816     | 1,888  |
| Shoresmen.....                    | 7     | 46         | 331     | 384    |
| Total.....                        | 670   | 552        | 1,170   | 2,392  |

Table showing, by counties and species, the yield of the fisheries of Delaware in 1897.

| Species.              | Kent.     |        | Newcastle. |         | Sussex.   |         | Total.    |          |
|-----------------------|-----------|--------|------------|---------|-----------|---------|-----------|----------|
|                       | Lbs.      | Value. | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.      | Value.   |
| Alewives, fresh.....  | 35,400    | \$550  | 350,000    | \$1,647 | 1,537,207 | \$9,663 | 1,922,607 | \$11,865 |
| Alewives, salted..... |           |        | 2,000      | 45      |           |         | 2,000     | 45       |
| Carp.....             | 28,300    | 1,442  | 83,000     | 3,750   |           |         | 111,300   | 5,192    |
| Cat-fish.....         | 22,300    | 1,488  | 25,340     | 1,573   | 20,650    | 786     | 68,290    | 3,847    |
| Croakers.....         | 215,000   | 1,470  |            |         | 82,600    | 1,084   | 297,600   | 2,554    |
| Eels.....             | 7,410     | 516    | 29,800     | 1,394   | 91,600    | 4,442   | 128,810   | 6,352    |
| Flounders.....        |           |        |            |         | 2,000     | 85      | 2,000     | 85       |
| Mullet, fresh.....    |           |        |            |         | 34,700    | 804     | 34,700    | 804      |
| Mullet, salted.....   |           |        |            |         | 3,000     | 40      | 3,000     | 40       |
| Perch.....            | 87,800    | 4,060  | 41,500     | 3,276   | 270,000   | 11,792  | 399,300   | 19,128   |
| Pike.....             | 10,600    | 781    |            |         | 30,650    | 1,246   | 41,250    | 2,027    |
| Sea bass.....         |           |        |            |         | 1,900     | 95      | 1,900     | 95       |
| Shad.....             | 247,332   | 7,932  | 974,216    | 26,926  | 398,816   | 13,104  | 1,620,364 | 47,962   |
| Squeteague.....       | 631,100   | 9,087  | 400        | 16      | 809,380   | 16,046  | 1,440,880 | 25,149   |
| Striped bass.....     | 38,410    | 3,160  | 25,500     | 2,365   | 64,860    | 6,508   | 128,770   | 12,033   |
| Sturgeon.....         | 85,860    | 2,905  | 187,380    | 5,638   | 7,110     | 471     | 280,350   | 9,014    |
| Suckers.....          | 29,900    | 1,300  |            |         | 5,300     | 243     | 35,200    | 1,543    |
| Tautog.....           |           |        |            |         | 4,800     | 240     | 4,800     | 240      |
| Crabs, soft.....      |           |        |            |         | 155,000   | 5,133   | 155,000   | 5,133    |
| Crabs, hard.....      | 7,800     | 136    |            |         | 6,000     | 120     | 13,800    | 256      |
| King-crabs.....       | 675,000   | 2,025  |            |         |           |         | 675,000   | 2,025    |
| Shrimp.....           |           |        | 320        | 160     |           |         | 320       | 160      |
| Lobsters.....         |           |        |            |         | 5,095     | 459     | 5,095     | 459      |
| Oysters, market.....  | 411,600   | 32,502 |            |         | 232,960   | 13,472  | 644,560   | 45,974   |
| Oysters, seed.....    | 501,830   | 17,923 |            |         |           |         | 501,830   | 17,923   |
| Clams.....            | 640       | 150    |            |         | 6,160     | 1,380   | 6,800     | 1,530    |
| Turtle.....           | 14,800    | 730    | 5,400      | 293     | 24,370    | 1,373   | 44,570    | 2,396    |
| Terrapin.....         | 3,135     | 725    | 1,156      | 139     | 4,081     | 1,692   | 8,322     | 2,556    |
| Caviar.....           | 21,870    | 8,100  | 46,103     | 17,075  | 1,506     | 561     | 69,479    | 25,736   |
| Total.....            | 3,076,087 | 96,982 | 1,772,115  | 64,297  | 3,799,695 | 90,844  | 8,647,897 | 252,123  |

<sup>1</sup> 465,000 in number.<sup>2</sup> 41,400 in number.<sup>3</sup> 337,500 in number.<sup>4</sup> 92,080 bushels.<sup>5</sup> 71,690 bushels.<sup>6</sup> 850 bushels.

## THE SHAD FISHERY.

The shad fishery of Delaware is prosecuted chiefly in the Delaware and Nanticoke rivers. In the former the yield was 1,368,364 pounds, valued at \$40,717, and in the latter 252,000 pounds, valued at \$7,245.

The following table shows the quantity of shad taken in each county of the State, in number instead of pounds, for the year 1897:

| Counties.      | No.                  | Value.  |
|----------------|----------------------|---------|
| Kent.....      | 65,955               | \$7,932 |
| Newcastle..... | 259,791              | 26,926  |
| Sussex.....    | 106,351              | 13,104  |
| Total.....     | <sup>1</sup> 432,097 | 47,962  |

<sup>1</sup> 1,620,364 pounds.

## FISHERIES BY APPARATUS.

The vessel fisheries of this State are confined to Kent County, the catch consisting almost entirely of oysters, of which 339,990 pounds (48,570 bushels), valued at \$24,707, were secured. Some squeteague were taken on lines by vessels which carry out pleasure parties during the summer season. At Lewes, in Sussex County, a few steamers land part of their fish at the menhaden factories, but as these steamers belong in other States their catch has not been credited to Delaware.

In the shore fisheries, so far as the quantity of fish secured is concerned, seines rank first, they having taken 3,677,291 pounds, valued at \$64,498, but in value of catch gill nets are first, having taken 2,577,114 pounds, valued at \$98,598. The principal species taken in seines are alewives, squeteague, and shad, while in gill nets the principal species are shad, sturgeon, and squeteague. The yield by oyster tongs is next in importance, its value being \$39,190. Fyke nets caught 157,310 pounds, valued at \$6,469, and pound nets 93,770 pounds, valued at \$2,197. Lines, pots, spears, miscellaneous nets, and other minor forms of apparatus were also used. A small lobster fishery, with pots, is carried on at Lewes. This is the southernmost point on the Atlantic seaboard where the lobster fishery is prosecuted.

The two tables which follow show the products of the vessel and shore fisheries, by each form of apparatus, for the year 1897:

*Table showing the yield of the vessel fisheries of Delaware in 1897.*

| Apparatus and species. | Kent County. |        |
|------------------------|--------------|--------|
|                        | Lbs.         | Value. |
| Lines:                 |              |        |
| Squeteague .....       | 9,400        | \$188  |
| Dredges:               |              |        |
| Oysters, market .....  | 167,160      | 18,534 |
| Oysters, seed .....    | 172,830      | 6,173  |
| Total .....            | 339,990      | 24,707 |
| Grand total .....      | 349,390      | 24,895 |

*Table showing, by counties and apparatus of capture, the yield of the shore fisheries of Delaware in 1897.*

| Apparatus and species. | Kent.   |        | Newcastle. |        | Sussex. |        | Total.    |        |
|------------------------|---------|--------|------------|--------|---------|--------|-----------|--------|
|                        | Lbs.    | Value. | Lbs.       | Value. | Lbs.    | Value. | Lbs.      | Value. |
| Gill nets:             |         |        |            |        |         |        |           |        |
| Alewives.....          | 3,600   | \$60   | 52,800     | \$440  | 15,500  | \$90   | 71,900    | \$590  |
| Carp .....             |         |        | 20,000     | 600    |         |        | 20,000    | 600    |
| Cat-fish .....         |         |        |            |        | 600     | 32     | 600       | 32     |
| Croakers .....         | 88,000  | 440    |            |        | 38,000  | 190    | 126,000   | 630    |
| Mullet .....           |         |        |            |        | 1,200   | 24     | 1,200     | 24     |
| Perch .....            | 48,000  | 2,542  | 40,400     | 3,232  | 78,700  | 3,633  | 167,100   | 9,407  |
| Pike .....             | 8,500   | 627    |            |        | 6,700   | 396    | 15,200    | 1,023  |
| Shad .....             | 219,644 | 6,672  | 970,176    | 26,804 | 197,476 | 6,027  | 1,387,296 | 39,503 |
| Squeteague .....       | 197,200 | 3,534  |            |        | 164,700 | 3,354  | 361,900   | 6,888  |
| Striped bass.....      | 26,210  | 1,940  | 6,100      | 814    | 15,000  | 1,120  | 47,310    | 3,874  |
| Sturgeon.....          | 85,860  | 2,905  | 187,380    | 5,638  | 7,010   | 468    | 280,250   | 9,011  |
| Suckers .....          | 23,600  | 1,048  |            |        | 5,300   | 243    | 28,900    | 1,291  |
| Caviar .....           | 21,870  | 8,100  | 46,103     | 17,075 | 1,485   | 550    | 69,458    | 25,725 |
| Total.....             | 722,484 | 27,868 | 1,322,959  | 54,603 | 531,671 | 16,127 | 2,577,114 | 98,598 |



# 266 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the yield of the shore fisheries of Delaware in 1897—Continued.

| Apparatus and species.  | Kent.            |               | Newcastle.       |               | Sussex.          |               | Total.           |                |
|-------------------------|------------------|---------------|------------------|---------------|------------------|---------------|------------------|----------------|
|                         | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.             | Value.         |
| <b>Pound nets:</b>      |                  |               |                  |               |                  |               |                  |                |
| Alewives.....           |                  |               |                  |               | 22,000           | \$225         | 22,000           | \$225          |
| Cat-fish.....           |                  |               | 600              | \$60          | 1,300            | 65            | 1,900            | 125            |
| Croakers.....           |                  |               |                  |               | 25,000           | 125           | 25,000           | 125            |
| Eels.....               |                  |               |                  |               | 100              | 8             | 100              | 8              |
| Perch.....              |                  |               | 300              | 12            | 15,650           | 803           | 15,950           | 815            |
| Shad.....               |                  |               |                  |               | 4,040            | 182           | 4,040            | 182            |
| Squeteague.....         |                  |               | 400              | 16            | 23,200           | 528           | 23,600           | 544            |
| Striped bass.....       |                  |               | 600              | 60            | 460              | 46            | 1,060            | 106            |
| Terrapin.....           |                  |               | 120              | 67            |                  |               | 120              | 67             |
| Total.....              |                  |               | 2,020            | 215           | 91,750           | 1,982         | 93,770           | 2,197          |
| <b>Seines:</b>          |                  |               |                  |               |                  |               |                  |                |
| Alewives, fresh.....    | 31,800           | \$490         | 297,200          | 1,207         | 1,459,707        | 9,173         | 1,788,707        | 10,870         |
| Alewives, salted.....   |                  |               | 2,000            | 45            |                  |               | 2,000            | 45             |
| Carp.....               | 21,000           | 1,050         | 63,000           | 3,150         |                  |               | 84,000           | 4,200          |
| Cat-fish.....           | 1,000            | 40            | 10,840           | 636           | 18,750           | 689           | 30,590           | 1,365          |
| Croakers.....           | 127,000          | 1,030         |                  |               | 16,600           | 649           | 143,600          | 1,679          |
| Eels.....               |                  |               |                  |               | 54,000           | 2,270         | 54,000           | 2,270          |
| Flounders.....          |                  |               |                  |               | 2,000            | 85            | 2,000            | 85             |
| Mullet, fresh.....      |                  |               |                  |               | 33,500           | 780           | 33,500           | 780            |
| Mullet, salted.....     |                  |               |                  |               | 3,000            | 40            | 3,000            | 40             |
| Perch.....              | 32,800           | 1,224         | 800              | 32            | 156,350          | 6,704         | 189,950          | 7,960          |
| Pike.....               |                  |               |                  |               | 17,950           | 550           | 17,950           | 550            |
| Shad.....               | 22,888           | 1,044         | 4,040            | 122           | 193,700          | 6,760         | 220,628          | 7,926          |
| Squeteague.....         | 397,000          | 4,830         |                  |               | 612,380          | 11,821        | 1,009,380        | 16,651         |
| Striped bass.....       | 12,200           | 1,220         | 18,800           | 1,491         | 49,400           | 5,342         | 80,400           | 8,053          |
| Sturgeon.....           |                  |               |                  |               | 100              | 3             | 100              | 3              |
| Terrapin.....           | 3,090            | 710           | 36               | 12            | 3,489            | 1,072         | 6,615            | 1,794          |
| Crabs, hard.....        | 4,800            | 96            |                  |               | 6,000            | 120           | 10,800           | 216            |
| Caviar.....             |                  |               |                  |               | 21               | 11            | 21               | 11             |
| Total.....              | 653,578          | 11,734        | 396,716          | 6,695         | 2,626,947        | 46,069        | 3,677,241        | 64,498         |
| <b>Fyke nets:</b>       |                  |               |                  |               |                  |               |                  |                |
| Alewives.....           |                  |               |                  |               | 40,000           | 180           | 40,000           | 180            |
| Cat-fish.....           | 20,300           | 1,398         | 13,900           | 877           |                  |               | 34,200           | 2,275          |
| Eels.....               | 2,910            | 246           | 15,000           | 722           | 500              | 20            | 18,410           | 988            |
| Perch.....              | 4,600            | 190           |                  |               | 19,300           | 652           | 23,900           | 842            |
| Pike.....               | 2,100            | 154           |                  |               |                  |               | 2,100            | 154            |
| Suckers.....            | 6,300            | 252           |                  |               |                  |               | 6,300            | 252            |
| Turtle.....             | 14,400           | 714           |                  |               | 18,000           | 1,064         | 32,400           | 1,778          |
| Total.....              | 50,610           | 2,954         | 28,900           | 1,599         | 77,800           | 1,916         | 157,310          | 6,469          |
| <b>Minor nets:</b>      |                  |               |                  |               |                  |               |                  |                |
| Carp.....               | 7,300            | 392           |                  |               |                  |               | 7,300            | 392            |
| Cat-fish.....           | 1,000            | 50            |                  |               |                  |               | 1,000            | 50             |
| Perch.....              | 2,400            | 104           |                  |               |                  |               | 2,400            | 104            |
| Shad.....               | 4,800            | 216           |                  |               | 3,600            | 135           | 8,400            | 351            |
| Shrimp.....             |                  |               | 320              | 160           |                  |               | 320              | 160            |
| Crabs, soft.....        |                  |               |                  |               | 155,000          | 5,133         | 155,000          | 5,133          |
| Turtle.....             |                  |               |                  |               | 3,200            | 160           | 3,200            | 160            |
| Total.....              | 15,500           | 762           | 320              | 160           | 161,800          | 5,428         | 177,620          | 6,350          |
| <b>Lines:</b>           |                  |               |                  |               |                  |               |                  |                |
| Croakers.....           |                  |               |                  |               | 3,000            | 120           | 3,000            | 120            |
| Pike.....               |                  |               |                  |               | 6,000            | 300           | 6,000            | 300            |
| Sea bass.....           |                  |               |                  |               | 1,900            | 95            | 1,900            | 95             |
| Squeteague.....         | 27,500           | 535           |                  |               | 9,100            | 343           | 36,600           | 878            |
| Tautog.....             |                  |               |                  |               | 4,800            | 240           | 4,800            | 240            |
| Crabs, hard.....        | 3,000            | 40            |                  |               |                  |               | 3,000            | 40             |
| Total.....              | 30,500           | 575           |                  |               | 24,800           | 1,098         | 55,300           | 1,673          |
| <b>Pots and spears:</b> |                  |               |                  |               |                  |               |                  |                |
| Eels.....               | 4,500            | 270           | 14,800           | 672           | 37,000           | 2,144         | 56,300           | 3,086          |
| Lobsters.....           |                  |               |                  |               | 5,095            | 459           | 5,095            | 459            |
| Total.....              | 4,500            | 270           | 14,800           | 672           | 42,095           | 2,603         | 61,395           | 3,545          |
| <b>Tongs:</b>           |                  |               |                  |               |                  |               |                  |                |
| Oysters, market.....    | 244,440          | 13,968        |                  |               | 232,960          | 13,472        | 477,400          | 27,440         |
| Oysters, seed.....      | 329,000          | 11,750        |                  |               |                  |               | 329,000          | 11,750         |
| Total.....              | 573,440          | 25,718        |                  |               | 232,960          | 13,472        | 806,400          | 39,190         |
| <b>Other apparatus:</b> |                  |               |                  |               |                  |               |                  |                |
| Clams.....              | 640              | 150           |                  |               | 6,160            | 1,380         | 6,800            | 1,530          |
| King crabs.....         | 675,000          | 2,025         |                  |               |                  |               | 675,000          | 2,025          |
| Turtle.....             | 400              | 16            | 5,400            | 293           | 3,170            | 149           | 8,970            | 458            |
| Terrapin.....           | 45               | 15            | 1,000            | 60            | 542              | 620           | 1,587            | 695            |
| Total.....              | 676,085          | 2,206         | 6,400            | 353           | 9,872            | 2,149         | 692,357          | 4,708          |
| <b>Grand total.....</b> | <b>2,726,697</b> | <b>72,087</b> | <b>1,772,115</b> | <b>64,297</b> | <b>3,799,695</b> | <b>90,844</b> | <b>8,298,507</b> | <b>227,228</b> |

THE MENHADEN INDUSTRY.

The menhaden factories in Delaware are located at Lewes, in Sussex County. After the season of 1897 had closed they were purchased by the American Fisheries Company. In 1897 there were three factories in operation, valued at \$150,000, in which 105 persons were engaged. The amount of cash capital employed was \$50,000. The vessels supplying the factories with fish were owned in other States, and have therefore not been included in the following table showing the extent of the industry in Delaware:

| Items.                                | No.         | Value.    |
|---------------------------------------|-------------|-----------|
| Factories.....                        | 3           | \$150,000 |
| Cash capital.....                     |             | 50,000    |
| Persons in factories.....             | 105         |           |
| Menhaden utilized.....                | 100,000,000 | 125,000   |
| Tons of dry and acidulated scrap..... | 7,700       | 92,850    |
| Gallons of oil made.....              | 316,800     | 69,300    |

THE KING-CRAB INDUSTRY.

The preparation of fertilizer from king-crabs in Delaware is carried on in Kent County. The property used in the business is valued at \$3,000, and six persons only are employed. Six hundred and seventy-five thousand king crabs, costing \$4,050, were utilized to make 225 tons of fertilizer, worth \$6,975.

THE WHOLESALE FISHERY TRADE.

The wholesale trade in fishery products in Delaware is centered chiefly at Wilmington and Seaford. At the former place the trade is principally in fresh fish, shad being the most important species, and at the latter oysters are the most important product. There are a number of shucking houses at Seaford where the greater part of the oysters are opened before shipment to market. At various other localities in the State shad, sturgeon, and other species are handled in small quantities. The following table shows the extent of the wholesale trade at Wilmington and Seaford in 1897:

| Items.                         | Wilmington. |          | Seaford. |          | Total.    |          |
|--------------------------------|-------------|----------|----------|----------|-----------|----------|
|                                | No.         | Value.   | No.      | Value.   | No.       | Value.   |
| Establishments.....            | 6           | \$15,300 | 6        | \$11,000 | 12        | \$26,300 |
| Cash capital.....              |             | 4,200    |          | 32,500   |           | 86,700   |
| Persons engaged.....           | 18          |          | 226      |          | 244       |          |
| <i>Products handled.</i>       |             |          |          |          |           |          |
| Oysters opened.....gallons..   |             |          | 178,500  | 145,556  | 178,500   | 145,556  |
| Oysters in shell.....bushels.. | 12,120      | 10,296   |          |          | 12,120    | 10,296   |
| Clams.....                     | 384,000     | 1,283    |          |          | 384,000   | 1,283    |
| Crabs, hard.....               | 165,000     | 1,650    |          |          | 165,000   | 1,650    |
| Fish, fresh.....pounds..       | 859,930     | 32,718   | 173,750  | 6,320    | 1,033,680 | 39,038   |
| Value of products.....         |             | 45,947   |          | 151,876  |           | 197,823  |

## FISHERIES OF MARYLAND.

The fisheries of Maryland are prosecuted chiefly on the Chesapeake Bay and its tributaries. This bay, the greater part of which is within the jurisdiction of Maryland, is the largest on the coast of the United States, and may properly be regarded as the world's greatest natural oyster-producing area. In addition to the great output of oysters, for which it has long been remarkable, it also produces large quantities of fish of various species, crabs, shrimp, clams (*Venus mercenaria*), terrapin, and turtles.

The rivers flowing into the Chesapeake, some of which are of considerable importance to navigation, also contribute very largely to the fishery resources of the State. The more important of these are the Potomac, which forms the boundary between Maryland and Virginia on the west and south, the Patuxent, Susquehanna, Chester, Choptank, Nanticoke, Wicomico, and Pocomoke. All of these rivers have fisheries of greater or less importance, the larger ones being especially noted for their abundant yield of shad.

The principal localities or fishing centers of the State are Baltimore, Annapolis, and Havre de Grace, on the western shore, and St. Michaels, Oxford, Cambridge, and Crisfield, on the eastern shore. The fishing operations are, however, not confined to these localities, but are prosecuted more or less extensively at almost every village or settlement along the shores.

Considering that only one county of Maryland reaches the seacoast, and that all the others are located on the Chesapeake Bay and its tributaries, the fisheries of the State are very extensive. They surpass, in value of products, those of any other State in the Middle Atlantic region.

The number of persons employed on vessels fishing and transporting fishery products in 1897 was 8,087; on boats used in various branches of shore fisheries, 18,540; in oyster canneries, shucking and packing houses, 16,185; a total of 42,812.

The fishing fleet comprised 1,419 vessels, engaged in fishing and transporting, having a net register of 23,670 tons and valued at \$1,078,560. Their outfits, consisting chiefly of provisions, were valued at \$265,982. In the shore fisheries there were 10,077 boats used, having a value of \$562,455.

The various forms of apparatus of capture used on vessels were oyster and crab dredges, oyster tongs, seines, lines, and eel pots, the value of which was \$67,537. The apparatus used in the shore or boat fisheries consisted principally of seines, gill nets, pound nets, trap nets, weirs, fyke nets, trammel nets, lines, eel pots, spears, oyster and crab dredges, and oyster tongs, valued at \$328,122; the total value of apparatus being \$395,659.

The value of oyster canneries, oyster and crab houses, wholesale fish establishments, and all other shore property connected with the fisheries was \$1,878,669, the amount of cash or working capital required in conducting the various branches of trade in fishery products was \$1,640,285, and the total investment in the fisheries and related industries, including vessels, outfits, boats, apparatus of capture, shore and accessory property, and cash capital, amounted to \$5,821,610.

The products taken by all kinds of apparatus consisted of 28,213,744 pounds of fish, fresh and salted, valued at \$500,745; soft crabs 12,347,637 in number, valued at \$177,637; hard crabs 15,999,948 in number, valued at \$39,949; shrimp, 1,020 pounds, valued at \$510; crawfish, 2,908 pounds, valued at \$262; oysters, 7,254,934 bushels, valued at \$2,885,202; clams, 15,286 bushels, valued at \$8,842; turtles, 5,465 pounds, valued at \$289, and terrapin, principally diamond-back, 7,266 pounds, valued at \$3,226; the total value, including 1,594 pounds of caviar, valued at \$644; being \$3,617,306.

Oysters were taken in greater abundance than any other species, the catch comprising nearly 80 per cent of the value of the entire product. The crab catch is next in importance, aggregating in number of soft and hard crabs 28,347,585, and in value \$217,586. The shad is also an important species; the quantity taken and sold fresh was 5,779,563 pounds, valued at \$158,865, besides which 20,000 pounds, valued at \$500, were sold in a salted condition. Alewives are also very abundant, the quantity sold fresh being 11,727,199 pounds, valued at \$72,657, and salted 5,408,900 pounds, valued at \$50,676. Various other species, as blue-fish, butter-fish, carp, cat-fish, croakers, eels, menhaden, white and yellow perch, pike, squeteague, striped bass, sturgeon, and suckers, are also taken in considerable quantities. The diamond-back terrapin, which has heretofore been a prominent species in this section, has largely decreased in abundance. The catch of menhaden is also not so large as it has been in previous years, chiefly from the fact that while a number of vessels belonging to Maryland were engaged in this fishery they were chartered in Virginia and their catch has been properly credited to that State.

The three following tables exhibit the number of persons, the number and value of vessels, boats, and apparatus of capture, the value of the shore and accessory property, the amount of cash capital employed, and the quantity and value of the products of the fisheries of Maryland in 1897:

*Persons employed.*

| How engaged.                     | No.    |
|----------------------------------|--------|
| On vessels fishing .....         | 6,962  |
| On vessels transporting .....    | 1,125  |
| In shore or boat fisheries ..... | 18,540 |
| Shoresmen .....                  | 16,185 |
| Total .....                      | 42,812 |

Table of apparatus and capital.

| Items.                                       | No.    | Value.    | Items.  | No.    | Value.    |
|--|--------|-----------|---|--------|-----------|
| Vessels fishing.....                         | 1,087  | \$650,275 | Apparatus—shore fisheries—continued.          |        |           |
| Tonnage.....                                 | 13,162 |           | Pound nets.....                               | 839    | \$80,340  |
| Outfit.....                                  |        | 218,044   | Trap nets and weirs.....                      | 17     | 775       |
| Vessels transporting.....                    | 332    | 428,285   | Fyke nets.....                                | 7,117  | 23,108    |
| Tonnage.....                                 | 10,508 |           | Trammel nets (total length, 6,504 yards)..... | 31     | 2,320     |
| Outfit.....                                  |        | 47,938    | Minor nets.....                               | 833    | 1,915     |
| Boats.....                                   | 10,077 | 562,455   | Lines.....                                    |        | 2,233     |
| Apparatus—vessel fisheries:                  |        |           | Eel pots.....                                 | 3,360  | 1,770     |
| Oyster dredges or scrapes.....               | 3,877  | 65,306    | Spears.....                                   | 50     | 113       |
| Crab dredges or scrapes.....                 | 119    | 475       | Oyster dredges or scrapes.....                | 1,837  | 23,511    |
| Tongs.....                                   | 72     | 560       | Crab dredges or scrapes.....                  | 2,687  | 9,819     |
| Seines.....                                  | 2      | 415       | Tongs.....                                    | 11,119 | 66,087    |
| Lines.....                                   |        | 5         | Shore and accessory property.....             |        | 1,878,669 |
| Eel pots.....                                | 1,550  | 776       | Cash capital.....                             |        | 1,640,285 |
| Apparatus—shore fisheries:                   |        |           | Total.....                                    |        | 5,821,610 |
| Seines (total length, 73,866 yards).....     | 328    | 38,867    |   |        |           |
| Gill nets (total length, 938,888 yards)..... | 8,464  | 77,264    |   |        |           |

Table of products.

| Species.              | Lbs.       | Value.   | Species.              | Lbs.                    | Value.    |
|-----------------------|------------|----------|-----------------------|-------------------------|-----------|
| Alewives, fresh.....  | 11,727,199 | \$72,657 | Sea bass.....         | 16,200                  | \$690     |
| Alewives, salted..... | 5,408,900  | 50,676   | Shad, fresh.....      | 5,779,563               | 158,865   |
| Alewives, smoked..... | 3,360      | 120      | Shad, salted.....     | 20,000                  | 500       |
| Black bass.....       | 6,765      | 613      | Sheepshead.....       | 200                     | 12        |
| Blue-fish.....        | 186,708    | 7,156    | Spanish mackerel..... | 9,762                   | 833       |
| Bonito.....           | 1,000      | 50       | Spots.....            | 2,928                   | 139       |
| Butter-fish.....      | 87,040     | 2,348    | Squeteague.....       | 597,179                 | 14,792    |
| Carp.....             | 110,925    | 3,825    | Striped bass.....     | 935,347                 | 70,045    |
| Cat-fish.....         | 578,021    | 19,644   | Sturgeon.....         | 145,569                 | 5,008     |
| Cero.....             | 1,000      | 50       | Suckers.....          | 83,030                  | 1,801     |
| Croakers.....         | 236,295    | 2,889    | Sun-fish.....         | 4,000                   | 152       |
| Drum.....             | 43,000     | 386      | Crabs, soft.....      | <sup>1</sup> 4,115,879  | 177,637   |
| Eels.....             | 406,744    | 14,684   | Crabs, hard.....      | <sup>2</sup> 5,333,316  | 39,949    |
| Flounders.....        | 27,357     | 1,097    | Shrimp.....           | 1,020                   | 510       |
| Hickory shad.....     | 3,752      | 53       | Craw-fish.....        | 2,908                   | 262       |
| King-fish.....        | 1,000      | 35       | Oysters.....          | <sup>3</sup> 50,784,538 | 2,885,202 |
| Menhaden.....         | 353,100    | 365      | Clams.....            | <sup>4</sup> 122,288    | 8,842     |
| Mullet.....           | 1,500      | 60       | Turtles.....          | 5,465                   | 289       |
| Perch, white.....     | 925,545    | 49,963   | Terrapins.....        | 7,266                   | 3,226     |
| Perch, yellow.....    | 395,735    | 12,283   | Caviar.....           | 1,594                   | 644       |
| Pike.....             | 114,710    | 8,919    | Total.....            | 88,588,018              | 3,617,306 |
| Pompano.....          | 310        | 35       |                       |                         |           |

<sup>1</sup> 12,347,637 in number.<sup>2</sup> 15,999,948 in number.<sup>3</sup> 7,254,934 bushels.<sup>4</sup> 15,286 bushels.

The catch of hard and soft crabs, clams, and oysters in Maryland for 1897, which, for purposes of comparison, have been shown in the general products tables in pounds, are presented in the following table in number and bushels:

| Products.                | No.        | Value.    |
|--------------------------|------------|-----------|
| Crabs, hard.....number.. | 15,999,948 | \$39,949  |
| Crabs, soft.....do.....  | 12,347,637 | 177,637   |
| Clams.....bushels..      | 15,286     | 8,842     |
| Oysters.....do.....      | 7,254,934  | 2,885,202 |

## THE FISHERIES BY COUNTIES.

The State is divided by the Chesapeake Bay and the Susquehanna River, which flows into its head waters, into two great sections. In the eastern part of the State there are 9 counties, all of which are interested in the fisheries. These are Cecil, Kent, Queen Anne, Talbot, Caroline, Dorchester, Wicomico, Somerset, and Worcester. They



are all located on the Chesapeake except Worcester, which borders on the Atlantic Ocean and has a coast line about 35 miles long. Of the 14 counties in the western part of the State, 7 have fishery interests. These are Harford, Baltimore, Anne Arundel, and Calvert, on the bay; Prince George and Charles, on the Potomac River, and St. Mary, bordering the Potomac and Patuxent rivers and the bay.

The counties having the most important fisheries were Anne Arundel, Baltimore, Dorchester, Somerset, and Talbot. The number of persons employed in the industry in Anne Arundel County was 2,893, the amount of capital invested \$160,370, and the value of the products \$263,366. In Baltimore County the number of persons employed was 13,823, capital invested \$3,422,885, and the value of the products \$254,887. The large number of persons employed and amount of capital invested in this county are chiefly due to the extensive oyster-canning industry and opened-oyster trade of the city of Baltimore. The products of the fisheries proper do not equal those of Anne Arundel County. The fisheries of Dorchester County gave employment to 5,963 persons, the capital invested amounted to \$570,911, and the value of the products to \$684,847. The number of persons employed in Somerset County was 7,069, capital invested \$755,420, and the products were valued at \$671,365. Talbot county had 3,011 persons employed, \$262,069 invested, and the value of the products was \$384,383. These counties were also the most prominent ones in the vessel fisheries. The largest number of vessels was in Somerset and Dorchester, the former having 433 and the latter 394. The fisheries of Worcester County were also important, the value of its products amounting to \$307,030, being surpassed in this respect only by Dorchester, Somerset, and Talbot counties. The oyster fisheries were of greatest importance in Dorchester County, the crab fisheries in Somerset, and, in value, the shad fisheries in Talbot.

The three following tables show the extent of the fisheries in each county of Maryland in 1897:

*Table showing the number of persons employed in the fisheries of Maryland in 1897.*

| Counties.          | In vessel fisheries. | On trans-<br>porting<br>vessels. | In shore<br>or boat<br>fisheries. | Shores-<br>men. | Total. |
|--------------------|----------------------|----------------------------------|-----------------------------------|-----------------|--------|
| Anne Arundel.....  | 105                  | 77                               | 2,352                             | 359             | 2,893  |
| Baltimore .....    | 1,581                | 395                              | 161                               | 11,686          | 13,823 |
| Calvert .....      | 180                  | 52                               | 1,217                             | 73              | 1,522  |
| Caroline .....     |                      |                                  | 361                               |                 | 361    |
| Cecil .....        |                      |                                  | 633                               | 32              | 665    |
| Charles .....      | 15                   | 11                               | 658                               | 30              | 714    |
| Dorchester.....    | 2,006                | 186                              | 2,741                             | 1,030           | 5,963  |
| Harford .....      |                      | 11                               | 570                               | 275             | 856    |
| Kent .....         | 13                   | 41                               | 1,260                             |                 | 1,314  |
| Prince George..... |                      |                                  | 142                               |                 | 142    |
| Queen Anne .....   |                      | 27                               | 1,135                             |                 | 1,162  |
| St. Mary .....     | 70                   | 56                               | 1,039                             |                 | 1,165  |
| Somerset .....     | 2,285                | 169                              | 2,790                             | 1,825           | 7,069  |
| Talbot .....       | 628                  | 56                               | 1,585                             | 742             | 3,011  |
| Wicomico .....     | 79                   | 22                               | 1,036                             | 112             | 1,249  |
| Worcester .....    |                      | 22                               | 860                               | 21              | 903    |
| Total .....        | 6,962                | 1,125                            | 18,540                            | 16,185          | 42,812 |



Table showing, by counties, the vessels, boats, apparatus, and shore property employed in the fisheries of Maryland in 1897.

| Items.                             | Anne Arundel. |         | Baltimore. |           | Calvert. |          | Caroline. |         |
|------------------------------------|---------------|---------|------------|-----------|----------|----------|-----------|---------|
|                                    | No.           | Value.  | No.        | Value.    | No.      | Value.   | No.       | Value.  |
| Vessels fishing .....              | 27            | \$9,665 | 183        | \$230,385 | 27       | \$10,955 | .....     | .....   |
| Tonnage .....                      | 216           |         | 4,459      |           | 342      |          | .....     | .....   |
| Outfit .....                       |               | 3,209   |            | 59,470    |          | 5,045    | .....     | .....   |
| Vessels transporting .....         | 34            | 20,775  | 92         | 194,050   | 14       | 12,200   | .....     | .....   |
| Tonnage .....                      | 442           |         | 4,334      |           | 451      |          | .....     | .....   |
| Outfit .....                       |               | 3,062   |            | 18,802    |          | 1,970    | .....     | .....   |
| Boats .....                        | 921           | 67,000  | 73         | 3,031     | 565      | 35,350   | 159       | \$1,697 |
| Apparatus—vessel fisheries:        |               |         |            |           |          |          |           |         |
| Oyster dredges or scrapes .....    | 38            | 815     | 629        | 12,671    | 106      | 1,598    | .....     | .....   |
| Tongs .....                        | 35            | 224     |            |           | 15       | 192      | .....     | .....   |
| Lines .....                        |               |         |            | 5         |          |          | .....     | .....   |
| Apparatus—shore fisheries:         |               |         |            |           |          |          |           |         |
| Seines .....                       | 26            | 2,376   | 13         | 3,650     | 10       | 965      | 17        | 1,835   |
| Gill nets .....                    | 26            | 466     | 21         | 385       | 17       | 160      | 506       | 5,079   |
| Pound nets .....                   | 60            | 6,240   | 10         | 850       | 36       | 5,950    | 15        | 800     |
| Trap nets and weirs .....          |               |         | 2          | 30        |          |          |           |         |
| Fyke nets .....                    | 25            | 290     | 806        | 2,110     |          |          | 52        | 233     |
| Trammel nets .....                 | 3             | 210     |            |           |          |          |           |         |
| Minor nets .....                   | 132           | 94      | 6          | 30        |          |          |           |         |
| Lines .....                        |               | 136     |            |           |          |          |           |         |
| Eel pots .....                     | 198           | 98      | 82         | 24        | 15       | 5        |           |         |
| Oyster dredges or scrapes .....    | 17            | 425     | 4          | 125       | 70       | 1,050    |           |         |
| Tongs .....                        | 1,467         | 9,353   |            |           | 1,148    | 8,857    |           |         |
| Shore and accessory property ..... |               | 20,532  |            | 1,533,807 |          | 1,535    |           | 5,190   |
| Cash capital .....                 |               | 15,400  |            | 1,363,460 |          |          |           |         |
| Total .....                        |               | 160,370 |            | 3,422,885 |          | 85,832   |           | 14,834  |

| Items.                             | Cecil. |          | Charles. |         | Dorchester. |           | Harford. |         |
|------------------------------------|--------|----------|----------|---------|-------------|-----------|----------|---------|
|                                    | No.    | Value.   | No.      | Value.  | No.         | Value.    | No.      | Value.  |
| Vessels fishing .....              |        |          | 3        | \$1,450 | 344         | \$147,335 | .....    | .....   |
| Tonnage .....                      |        |          | 22       |         | 2,929       |           | .....    | .....   |
| Outfit .....                       |        |          |          | 525     |             | 52,457    | .....    | .....   |
| Vessels transporting .....         |        |          | 4        | 2,650   | 50          | 79,450    | 5        | \$6,850 |
| Tonnage .....                      |        |          | 95       |         | 2,171       |           | 49       |         |
| Outfit .....                       |        |          |          | 420     |             | 7,604     |          | 360     |
| Boats .....                        | 276    | \$12,873 | 313      | 13,670  | 1,642       | 94,082    | 237      | 20,155  |
| Apparatus—vessel fisheries:        |        |          |          |         |             |           |          |         |
| Oyster dredges or scrapes .....    |        |          | 6        | 105     | 1,352       | 21,940    | .....    | .....   |
| Crab dredges or scrapes .....      |        |          |          |         | 19          | 57        | .....    | .....   |
| Tongs .....                        |        |          |          |         | 12          | 87        | .....    | .....   |
| Eel pots .....                     |        |          |          |         | 1,550       | 776       | .....    | .....   |
| Apparatus—shore fisheries:         |        |          |          |         |             |           |          |         |
| Seines .....                       | 14     | 4,745    | 6        | 3,250   | 8           | 415       | 14       | 9,615   |
| Gill nets .....                    | 234    | 9,583    | 239      | 7,279   | 771         | 3,214     | 356      | 10,454  |
| Pound nets .....                   | 144    | 10,280   | 66       | 5,675   | 137         | 10,810    | 16       | 1,460   |
| Trap nets and weirs .....          | 9      | 580      |          |         |             |           |          |         |
| Fyke nets .....                    | 4,322  | 9,245    |          |         | 72          | 368       | 1,285    | 3,144   |
| Trammel nets .....                 | 2      | 160      |          |         | 12          | 35        | 14       | 1,915   |
| Minor nets .....                   | 7      | 21       | 4        | 20      | 134         | 325       | 7        | 350     |
| Lines .....                        |        |          |          | 3       |             | 171       |          | 29      |
| Eel pots .....                     | 905    | 486      | 88       | 45      | 753         | 374       | 506      | 343     |
| Oyster dredges or scrapes .....    |        |          | 11       | 77      | 678         | 7,523     | .....    | .....   |
| Crab dredges or scrapes .....      |        |          |          |         | 198         | 594       | .....    | .....   |
| Tongs .....                        |        |          | 305      | 1,453   | 2,277       | 13,466    | .....    | .....   |
| Shore and accessory property ..... |        | 9,200    |          | 5,350   |             | 62,528    | .....    | 43,195  |
| Cash capital .....                 |        | 500      |          |         |             | 67,300    | .....    | 6,000   |
| Total .....                        |        | 57,673   |          | 41,972  |             | 570,911   |          | 103,870 |

Table showing, by counties, the vessels, boats, apparatus, and shore property employed in the fisheries of Maryland in 1897—Continued.

| Items.                             | Kent. |         | Prince George. |         | Queen Anne. |         | St. Mary. |         |
|------------------------------------|-------|---------|----------------|---------|-------------|---------|-----------|---------|
|                                    | No.   | Value.  | No.            | Value.  | No.         | Value.  | No.       | Value.  |
| Vessels fishing .....              | 2     | \$1,375 |                |         |             |         | 14        | \$5,450 |
| Tonnage .....                      | 25    |         |                |         |             |         | 118       |         |
| Outfit .....                       |       | 900     |                |         |             |         |           | 2,048   |
| Vessels transporting .....         | 17    | 11,150  |                |         | 11          | \$8,260 | 19        | 13,050  |
| Tonnage .....                      | 341   |         |                |         | 187         |         | 344       |         |
| Outfit .....                       |       | 2,008   |                |         |             | 1,315   |           | 2,239   |
| Boats .....                        | 711   | 40,627  | 55             | \$1,401 | 641         | 31,231  | 539       | 19,540  |
| Apparatus—vessel fisheries:        |       |         |                |         |             |         |           |         |
| Oyster dredges or scrapes .....    |       |         |                |         |             |         | 28        | 407     |
| Seines .....                       | 2     | 415     |                |         |             |         |           |         |
| Apparatus—shore fisheries:         |       |         |                |         |             |         |           |         |
| Seines .....                       | 34    | 1,324   | 14             | 2,640   | 59          | 1,597   | 2         | 375     |
| Gill nets .....                    | 2,306 | 23,323  | 30             | 610     | 145         | 1,034   | 12        | 585     |
| Pound nets .....                   | 98    | 7,110   | 8              | 570     | 26          | 3,120   | 66        | 9,105   |
| Trap nets and weirs .....          |       |         | 1              | 15      |             |         |           |         |
| Fyke nets .....                    | 175   | 2,705   |                |         | 90          | 773     |           |         |
| Minor nets .....                   |       |         | 8              | 40      |             |         | 30        | 8       |
| Lines .....                        |       | 407     |                |         |             | 245     |           | 64      |
| Eel pots .....                     | 54    | 18      |                |         | 172         | 84      | 95        | 38      |
| Oyster dredges or scrapes .....    |       |         |                |         |             |         | 74        | 704     |
| Tongs .....                        | 750   | 4,500   |                |         | 792         | 4,878   | 814       | 4,135   |
| Shore and accessory property ..... |       | 6,634   |                | 915     |             | 4,556   |           | 1,120   |
| Total .....                        |       | 102,496 |                | 6,191   |             | 57,093  |           | 58,868  |

| Items.                                  | Somerset. |           | Talbot. |          | Wicomico. |         | Worcester. |         | Total. |           |
|---|-----------|-----------|---------|----------|-----------|---------|------------|---------|--------|-----------|
|   | No.       | Value.    | No.     | Value.   | No.       | Value.  | No.        | Value.  | No.    | Value.    |
| Vessels fishing .....                   | 381       | \$179,545 | 92      | \$57,015 | 14        | \$7,100 |            |         | 1,087  | \$650,275 |
| Tonnage .....                           | 4,092     |           | 835     |          | 124       |         |            |         | 13,162 |           |
| Outfit .....                            |           | 71,746    |         | 21,175   |           | 1,469   |            |         |        | 218,044   |
| Vessels transporting .....              | 52        | 46,750    | 19      | 18,250   | 8         | 5,700   | 7          | \$9,150 | 332    | 428,285   |
| Tonnage .....                           | 1,350     |           | 383     |          | 146       |         | 215        |         | 10,508 |           |
| Outfit .....                            |           | 6,951     |         | 1,935    |           | 837     |            | 435     |        | 47,938    |
| Boats .....                             | 1,720     | 116,690   | 1,050   | 65,123   | 669       | 26,761  | 506        | 13,224  | 10,077 | 562,455   |
| Apparatus—vessel fisheries:             |           |           |         |          |           |         |            |         |        |           |
| Oyster dredges or scrapes .....         | 1,298     | 21,442    | 368     | 5,520    | 52        | 808     |            |         | 3,877  | 65,306    |
| Crab dredges or scrapes .....           | 100       | 418       |         |          |           |         |            |         | 119    | 475       |
| Tongs .....                             | 9         | 45        |         |          | 1         | 12      |            |         | 72     | 560       |
| Seines .....                            |           |           |         |          |           |         |            |         | 2      | 415       |
| Lines .....                             |           |           |         |          |           |         |            |         |        | 5         |
| Eel pots .....                          |           |           |         |          |           |         |            |         | 1,550  | 776       |
| Apparatus—shore fisheries:              |           |           |         |          |           |         |            |         |        |           |
| Seines .....                            |           |           | 2       | 200      | 3         | 225     | 106        | 5,655   | *328   | 38,867    |
| Gill nets .....                         | 75        | 510       | 1,240   | 4,157    | 588       | 5,821   | 1,898      | 4,604   | †8,464 | 77,264    |
| Pound nets .....                        | 34        | 4,885     | 101     | 7,335    | 21        | 3,150   | 1          | 3,000   | 839    | 80,340    |
| Trap nets and weirs .....               |           |           | 5       | 150      |           |         |            |         | 17     | 775       |
| Fyke nets .....                         | 24        | 445       | 43      | 394      | 223       | 3,401   |            |         | 7,117  | 23,108    |
| Trammel nets .....                      |           |           |         |          |           |         |            |         | †31    | 2,320     |
| Minor nets .....                        | 302       | 541       | 119     | 128      | 15        | 50      | 69         | 308     | 833    | 1,915     |
| Lines .....                             |           | 102       |         | 780      |           | 143     |            | 153     |        | 2,233     |
| Eel pots .....                          | 87        | 33        | 88      | 44       | 179       | 109     | 138        | 69      | 3,360  | 1,770     |
| Spears .....                            | 50        | 113       |         |          |           |         |            |         | 50     | 113       |
| Oyster dredges or scrapes .....         | 897       | 12,725    | 68      | 630      | 18        | 202     |            |         | 1,837  | 23,511    |
| Crab dredges or scrapes .....           | 2,489     | 9,225     |         |          |           |         |            |         | 2,687  | 9,819     |
| Tongs .....                             | 1,493     | 6,828     | 1,115   | 7,224    | 653       | 3,924   | 305        | 1,469   | 11,119 | 66,087    |
| Shore and accessory prop-<br>erty ..... |           | 113,876   |         | 48,884   |           | 3,635   |            | 17,712  |        | 1,878,669 |
| Cash capital .....                      |           | 162,550   |         | 23,075   |           | 2,000   |            |         |        | 1,640,285 |
| Total .....                             |           | 755,420   |         | 262,069  |           | 65,347  |            | 55,779  |        | 5,821,610 |

\* Total length of seines, 73,866 yards.

† Total length of gill nets, 938,888 yards.

‡ Total length of trammel nets, 6,504 yards.

Table showing, by counties, the yield of the fisheries of Maryland in 1897.

| Species.         | Cecil.    |         | Charles.  |         | Dorchester. |         | Harford.  |         |
|------------------|-----------|---------|-----------|---------|-------------|---------|-----------|---------|
|                  | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.        | Value.  | Lbs.      | Value.  |
| Alewives, fresh  | 1,908,440 | \$8,847 | 1,153,000 | \$5,336 | 1,122,484   | \$7,727 | 1,682,520 | \$8,568 |
| Alewives, salted | 1,785,360 | 15,966  | 248,000   | 1,580   |             |         | 3,279,740 | 31,898  |
| Alewives, smoked |           |         |           |         |             |         | 3,360     | 120     |
| Black bass       | 5,280     | 520     |           |         |             |         | 675       | 56      |
| Blue-fish        |           |         | 1,350     | 48      | 8,100       | 318     | 2,150     | 107     |
| Carp             | 6,100     | 141     | 820       | 25      |             |         | 3,820     | 120     |
| Cat-fish         | 76,645    | 2,763   | 33,130    | 880     | 55,325      | 1,820   | 54,427    | 1,979   |
| Croakers         |           |         | 1,000     | 20      | 7,250       | 170     |           |         |
| Drum             |           |         |           |         | 400         | 4       |           |         |
| Eels             | 71,830    | 2,238   | 4,200     | 192     | 89,910      | 3,594   | 52,360    | 1,983   |
| Flounders        |           |         | 300       | 6       | 1,625       | 63      |           |         |
| Menhaden         |           |         |           |         | 5,000       | 5       |           |         |
| Perch, white     | 179,787   | 8,020   | 53,858    | 2,595   | 29,175      | 1,683   | 53,290    | 3,000   |
| Perch, yellow    | 131,760   | 4,046   | 11,150    | 279     | 9,875       | 290     | 17,600    | 478     |
| Pike             | 19,692    | 1,687   |           |         | 3,233       | 257     | 4,898     | 395     |
| Shad, fresh      | 680,281   | 18,824  | 735,732   | 14,825  | 449,590     | 15,559  | 432,361   | 11,668  |
| Shad, salted     |           |         | 20,000    | 500     |             |         |           |         |
| Sheepshead       |           |         |           |         | 200         | 12      |           |         |
| Spots            |           |         |           |         | 600         | 48      |           |         |
| Squeteague       |           |         | 1,625     | 61      | 7,550       | 262     |           |         |
| Striped bass     | 85,540    | 7,276   | 74,064    | 3,669   | 28,312      | 2,112   | 133,178   | 9,844   |
| Sturgeon         |           |         | 12,984    | 628     | 42,215      | 1,660   |           |         |
| Suckers          | 25,100    | 520     |           |         | 4,020       | 107     | 17,400    | 331     |
| Sun-fish         | 850       | 30      |           |         |             |         | 150       | 2       |
| Crabs, soft      |           |         |           |         | 199,767     | 8,976   |           |         |
| Crabs, hard      |           |         | 5,600     | 36      | 1,356,250   | 10,635  |           |         |
| Crawfish         |           |         | 833       | 75      |             |         |           |         |
| Oysters          |           |         | 524,230   | 29,147  | 13,212,059  | 627,575 |           |         |
| Turtles          | 1,400     | 49      |           |         | 1,300       | 65      |           |         |
| Terrapin         |           |         |           |         | 3,652       | 1,905   |           |         |
| Caviar           |           |         | 954       | 420     |             |         |           |         |
| Total            | 4,978,065 | 70,927  | 2,882,830 | 60,322  | 16,637,892  | 684,847 | 5,737,929 | 70,549  |

| Species.         | Somerset.  |         | Talbot.    |         | Wicomico. |         | Worcester. |         |
|------------------|------------|---------|------------|---------|-----------|---------|------------|---------|
|                  | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.       | Value.  |
| Alewives, fresh  | 139,600    | \$665   | 455,720    | \$3,186 | 426,440   | \$2,482 | 592,200    | \$4,563 |
| Blue-fish        | 25,190     | 651     | 63,320     | 2,515   | 100       | 6       | 14,840     | 696     |
| Bonito           |            |         |            |         |           |         | 1,000      | 50      |
| Butter-fish      | 400        | 3       |            |         | 640       | 25      | 86,000     | 2,320   |
| Cat-fish         | 9,235      | 314     | 21,890     | 636     | 80,404    | 3,386   | 4,600      | 143     |
| Cero             |            |         |            |         |           |         | 1,000      | 50      |
| Croakers         | 163,700    | 1,099   | 880        | 27      |           |         | 16,000     | 516     |
| Drum             | 32,100     | 277     |            |         |           |         | 10,500     | 105     |
| Eels             | 35,276     | 1,133   | 18,100     | 593     | 9,350     | 431     | 11,500     | 492     |
| Flounders        | 2,000      | 46      | 900        | 36      | 3,450     | 153     | 1,800      | 72      |
| King-fish        |            |         |            |         |           |         | 1,000      | 35      |
| Menhaden         | 69,400     | 90      |            |         |           |         | 73,500     | 138     |
| Mullet           |            |         |            |         |           |         | 1,500      | 60      |
| Perch, white     | 11,885     | 332     | 28,780     | 1,268   | 29,330    | 2,157   | 201,665    | 11,913  |
| Perch, yellow    |            |         | 8,750      | 395     | 10,200    | 330     | 1,500      | 63      |
| Pike             |            |         | 2,410      | 167     | 5,374     | 533     | 17,870     | 553     |
| Pompano          | 110        | 11      |            |         |           |         | 200        | 24      |
| Sea bass         |            |         |            |         |           |         | 8,200      | 410     |
| Shad, fresh      | 99,310     | 3,071   | 729,395    | 21,068  | 457,052   | 17,580  | 72,500     | 2,576   |
| Spanish mackerel | 600        | 48      | 2,400      | 212     |           |         | 800        | 96      |
| Spots            |            |         |            |         |           |         | 1,200      | 52      |
| Squeteague       | 87,950     | 1,258   | 9,250      | 366     | 705       | 43      | 390,700    | 9,214   |
| Striped bass     | 5,725      | 348     | 19,350     | 1,377   | 18,526    | 1,567   | 76,940     | 10,965  |
| Sturgeon         | 735        | 27      |            |         | 80,985    | 2,323   | 4,500      | 220     |
| Suckers          |            |         | 1,400      | 32      | 9,250     | 188     |            |         |
| Crabs, soft      | 3,395,337  | 141,349 | 150,042    | 5,558   |           |         |            |         |
| Crabs, hard      | 632,667    | 5,344   | 2,231,793  | 14,511  |           |         |            |         |
| Oysters          | 8,944,558  | 510,669 | 7,055,874  | 332,436 | 1,717,450 | 96,956  | 2,250,507  | 256,642 |
| Clams            | 49,368     | 3,780   |            |         |           |         | 72,920     | 5,062   |
| Turtles          |            |         |            |         | 2,765     | 175     |            |         |
| Terrapin         | 1,143      | 850     |            |         | 2,231     | 248     |            |         |
| Total            | 13,706,289 | 671,365 | 10,800,254 | 384,383 | 2,854,252 | 128,583 | 3,914,942  | 307,030 |

Table showing, by counties, the yield of the fisheries of Maryland in 1897—Continued.

| Species.              | Anne Arundel. |         | Baltimore. |         | Calvert.  |         | Caroline. |         |
|-----------------------|---------------|---------|------------|---------|-----------|---------|-----------|---------|
|                       | Lbs.          | Value.  | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.      | Value.  |
| Alewives, fresh.....  | 928,000       | \$4,404 | 134,267    | \$428   | 626,400   | \$3,580 | 247,640   | \$1,771 |
| Alewives, salted..... | 3,000         | 72      |            |         |           |         |           |         |
| Blue-fish.....        | 23,560        | 1,057   | 4,100      | 144     | 4,550     | 194     |           |         |
| Carp.....             | 28,660        | 1,446   | 36,990     | 1,110   | 3,550     | 117     | 1,550     | 40      |
| Cat-fish.....         | 20,170        | 880     | 46,250     | 958     | 7,200     | 285     | 11,330    | 411     |
| Croakers.....         | 12,750        | 443     | 2,400      | 48      | 19,700    | 296     |           |         |
| Eels.....             | 33,475        | 1,289   | 26,028     | 561     | 1,640     | 55      | 1,950     | 77      |
| Flounders.....        |               |         |            |         | 7,150     | 293     |           |         |
| Menhaden.....         | 25,200        | 42      |            |         |           |         |           |         |
| Perch, white.....     | 24,530        | 1,600   | 33,219     | 1,686   | 8,425     | 331     | 22,470    | 943     |
| Perch, yellow.....    | 15,350        | 501     | 104,600    | 2,213   | 2,630     | 84      | 11,310    | 562     |
| Pike.....             | 2,795         | 160     | 40,798     | 3,846   |           |         | 1,940     | 144     |
| Sea bass.....         |               |         | 8,000      | 280     |           |         |           |         |
| Shad, fresh.....      | 171,375       | 4,877   | 30,800     | 770     | 160,120   | 3,516   | 657,596   | 17,159  |
| Squeteague.....       | 45,475        | 1,799   | 3,300      | 99      | 15,200    | 456     |           |         |
| Striped bass.....     | 24,950        | 1,870   | 66,320     | 4,406   | 42,100    | 2,819   | 10,132    | 776     |
| Sturgeon.....         |               |         |            |         | 350       | 15      |           |         |
| Suckers.....          | 700           | 19      | 9,300      | 181     | 700       | 21      | 4,380     | 129     |
| Sun-fish.....         | 3,000         | 120     |            |         |           |         |           |         |
| Crabs, soft.....      | 154,461       | 8,398   |            |         |           |         |           |         |
| Crabs, hard.....      | 220,200       | 1,685   |            |         |           |         |           |         |
| Shrimp.....           |               |         | 1,020      | 510     |           |         |           |         |
| Oysters.....          | 4,093,369     | 232,681 | 3,300,010  | 237,647 | 1,903,055 | 138,168 |           |         |
| Terrapin.....         | 20            | 23      |            |         | 220       | 200     |           |         |
| Caviar.....           |               |         |            |         | 40        | 14      |           |         |
| Total.....            | 5,831,040     | 263,366 | 3,847,402  | 254,887 | 2,803,030 | 150,444 | 970,298   | 22,012  |

| Species.              | Kent.     |         | Prince George. |         | Queen Anne. |         | St. Mary. |          |
|-----------------------|-----------|---------|----------------|---------|-------------|---------|-----------|----------|
|                       | Lbs.      | Value.  | Lbs.           | Value.  | Lbs.        | Value.  | Lbs.      | Value.   |
| Alewives, fresh.....  | 778,560   | \$5,514 | 529,700        | \$2,482 | 396,760     | \$2,855 | 605,468   | \$10,249 |
| Alewives, salted..... | 92,800    | 1,160   |                |         |             |         |           |          |
| Black bass.....       |           |         | 810            | 37      |             |         |           |          |
| Blue-fish.....        | 8,400     | 269     |                |         | 7,650       | 232     | 23,398    | 919      |
| Carp.....             | 3,000     | 90      | 3,965          | 146     | 17,180      | 451     | 5,290     | 139      |
| Cat-fish.....         | 63,800    | 2,355   | 39,130         | 1,472   | 46,810      | 1,187   | 7,675     | 175      |
| Croakers.....         | 850       | 36      |                |         | 2,350       | 56      | 9,415     | 178      |
| Eels.....             | 10,705    | 364     | 2,600          | 78      | 32,620      | 1,366   | 5,200     | 238      |
| Flounders.....        |           |         |                |         |             |         | 10,132    | 428      |
| Hickory shad.....     |           |         |                |         |             |         | 3,752     | 53       |
| Menhaden.....         |           |         |                |         |             |         | 180,000   | 90       |
| Perch, white.....     | 178,964   | 11,039  | 22,555         | 1,172   | 19,088      | 1,100   | 28,524    | 1,124    |
| Perch, yellow.....    | 29,200    | 1,377   | 12,400         | 382     | 25,560      | 1,206   | 3,850     | 77       |
| Pike.....             | 11,610    | 881     | 2,300          | 151     | 1,790       | 145     |           |          |
| Shad, fresh.....      | 544,708   | 13,733  | 186,182        | 3,858   | 118,476     | 4,473   | 254,085   | 5,308    |
| Spanish mackerel..... |           |         |                |         |             |         | 5,962     | 477      |
| Spots.....            |           |         |                |         |             |         | 1,128     | 39       |
| Squeteague.....       | 2,740     | 93      |                |         | 6,100       | 183     | 26,584    | 958      |
| Striped bass.....     | 201,909   | 13,205  | 17,690         | 1,036   | 84,257      | 6,369   | 46,354    | 2,406    |
| Sturgeon.....         |           |         |                |         |             |         | 3,800     | 135      |
| Suckers.....          | 2,400     | 70      | 5,550          | 128     | 2,830       | 75      |           |          |
| Crabs, soft.....      | 76,080    | 5,166   |                |         | 122,192     | 7,515   | 18,000    | 675      |
| Crabs, hard.....      | 282,533   | 3,232   |                |         | 528,440     | 3,906   | 75,833    | 600      |
| Crawfish.....         |           |         | 2,075          | 187     |             |         |           |          |
| Oysters.....          | 2,325,834 | 140,625 |                |         | 2,725,821   | 122,953 | 2,731,771 | 159,703  |
| Caviar.....           |           |         |                |         |             |         | 600       | 210      |
| Total.....            | 4,614,093 | 199,209 | 824,957        | 11,129  | 4,137,924   | 154,072 | 4,046,821 | 184,181  |

The number and value of shad taken in each county of Maryland in 1897 is shown in the following table:

| Counties.         | No.     | Value.  | Counties.          | No.        | Value.  |
|-------------------|---------|---------|--------------------|------------|---------|
| Anne Arundel..... | 48,964  | \$4,877 | Prince George..... | 53,195     | \$3,858 |
| Baltimore.....    | 8,800   | 770     | Queen Anne.....    | 33,850     | 4,473   |
| Calvert.....      | 45,749  | 3,516   | St. Mary.....      | 72,596     | 5,308   |
| Caroline.....     | 187,885 | 17,159  | Somerset.....      | 28,374     | 3,071   |
| Cecil.....        | 194,366 | 18,824  | Talbot.....        | 208,399    | 21,068  |
| Charles.....      | 215,923 | 15,325  | Wicomico.....      | 130,586    | 17,580  |
| Dorchester.....   | 128,454 | 15,559  | Worcester.....     | 20,714     | 2,576   |
| Harford.....      | 123,532 | 11,668  |                    |            |         |
| Kent.....         | 155,631 | 13,733  | Total.....         | *1,657,018 | 159,365 |

\*5,799,563 pounds.

## PRODUCTS TAKEN BY VESSELS AND BOATS WITH EACH APPARATUS.

Owing to the large quantity of oysters taken in this State, dredges and tongs are the most productive forms of apparatus employed in both the vessel and shore fisheries. In the vessel fisheries, dredges are more generally used than tongs. The catch taken with them consisted of 2,416,446 bushels of oysters valued at \$943,051; soft crabs, 358,851 in number, valued at \$5,312; and hard crabs, 47,601 in number, valued at \$142. Tongs were also used to some extent, the catch by them being 31,578 bushels of oysters valued at \$13,357. In the shore or boat fisheries, tongs are the principal apparatus, the quantity of oysters obtained with them being 4,118,717 bushels valued at \$1,667,651, and of clams 15,286 bushels valued at \$8,842. Dredges or scrapes are also used extensively by small boats in the oyster and crab fisheries. The quantity of oysters secured by small boats with dredges was 688,193 bushels valued at \$261,143; of soft crabs 9,940,308 in number valued at \$138,512, and of hard crabs 602,100 in number valued at \$1,756. The value of all products taken with dredges in the vessel and shore fisheries combined was \$1,349,916, and with tongs \$1,689,850; a total of \$3,039,766.

Seines are the next most important apparatus, with respect to the value of the catch. They were used in the vessel fisheries to a limited extent, but were operated chiefly by small boats. The catch with seines by vessels was 42,004 pounds of fish valued at \$2,642, and by small boats in the shore fisheries 10,445,422 pounds of fish valued at \$142,249, soft crabs 606,816 in number, valued at \$12,931, and 220 pounds of terrapin valued at \$200; the total value of the catch with this apparatus being \$158,022. The principal species of fish taken were alewives, cat-fish, white and yellow perch, shad, squeteague, and striped bass.

The pound-net fisheries, embracing pound nets, trap nets, and weirs, were also of considerable importance. The catch of fish in this group of apparatus exceeded both in quantity and value that of seines, but the entire yield was slightly less in value. The products of this fishery consisted of 11,407,942 pounds of fish valued at \$157,518, and 600 pounds of caviar valued at \$210; a total of 11,408,542 pounds, having a value of \$157,728. The species secured in largest quantities were alewives, blue-fish, cat-fish, croakers, menhaden, white and yellow perch, shad, squeteague, and striped bass.

Gill nets were fished to a greater or less extent in every county having fisheries, and were the only apparatus, except pound nets, so widely distributed. The products derived were 4,653,198 pounds of fish valued at \$137,649, and 994 pounds of caviar valued at \$434; a total of 4,654,192 pounds valued at \$138,083, the value being second to that of the pound-net catch. Gill nets surpass every other single apparatus in the capture of shad, the catch of that species being

3,226,983 pounds valued at \$85,152. Alewives, blue-fish, white perch, striped bass, and sturgeon were also taken in large quantities.

The products taken with other kinds of apparatus are also noteworthy. The catch obtained by vessels with hand lines was 12,000 pounds of blue-fish and sea bass valued at \$420; and by boats with hand lines and trot lines, 224,750 pounds of fish valued at \$8,535; soft crabs, 248,127 in number, valued at \$1,518; hard crabs, 15,349,248 in number, valued at \$38,049; and 2,025 pounds of turtle valued at \$131, the total value of the catch with lines being \$48,653. The quantity of fish in fyke nets was 961,024 pounds valued at \$33,645; of terrapin 3,837 pounds valued at \$1,693, and of turtle 3,440 pounds valued at \$158; the total catch of all species being 968,301 pounds valued at \$35,496.

A variety of minor nets, consisting chiefly of dip nets, bow nets, terrapin nets, crawfish nets or dredges, turtle pots, and sunken fyke nets, was also operated, obtaining 103,519 pounds of fish valued at \$3,508; hard and soft crabs 1,194,534 in number, valued at \$19,366; shrimp 1,020 pounds valued at \$510; crawfish 2,908 pounds valued at \$262; terrapin 3,209 pounds valued at \$1,333; the total value being \$24,979. The quantity of eels caught by vessels with eel pots was 61,000 pounds valued at \$2,440, and by boats with eel pots and spears 245,295 pounds valued at \$8,600, a total of 306,295 pounds valued at \$11,040. In trammel nets 57,590 pounds of fish, principally white perch and striped bass, were taken, having a value of \$3,539. The apparatus of capture employed in the vessel fisheries of the State was not so varied nor the products obtained so valuable as in the shore or boat fisheries. The aggregate value of the products of the vessel fisheries was \$967,364, and of the shore fisheries \$2,649,942.

Following are tables showing by counties the quantity and value of all species taken by vessels and boats with each apparatus in 1897:

*Table showing, by counties, the seine catch of Maryland in 1897.*

| Species.            | Anne Arundel. |        | Baltimore. |        | Calvert. |        | Caroline. |        |
|---------------------|---------------|--------|------------|--------|----------|--------|-----------|--------|
|                     | Lbs.          | Value. | Lbs.       | Value. | Lbs.     | Value. | Lbs.      | Value. |
| Shore fisheries:    |               |        |            |        |          |        |           |        |
| Alewives, fresh ... | 41,000        | \$246  | 67,800     | \$193  | 62,500   | \$313  | 170,708   | \$991  |
| Blue-fish .....     | 11,715        | 471    |            |        | 375      | 24     |           |        |
| Carp .....          | 28,000        | 1,420  | 35,000     | 1,050  | 1,100    | 44     | 920       | 21     |
| Cat-fish .....      | 13,600        | 562    | 23,050     | 468    | 6,000    | 244    | 4,680     | 152    |
| Croakers .....      | 12,750        | 443    | 2,400      | 48     |          |        |           |        |
| Eels .....          | 8,525         | 321    | 5,400      | 112    | 300      | 14     | 800       | 32     |
| Flounders .....     |               |        |            |        | 500      | 24     |           |        |
| Perch, white .....  | 12,630        | 717    | 15,205     | 784    | 3,775    | 151    | 14,500    | 532    |
| Perch, yellow ..... | 14,800        | 479    | 34,700     | 747    | 2,000    | 65     | 4,490     | 201    |
| Pike .....          | 725           | 61     | 9,300      | 860    |          |        | 410       | 31     |
| Shad, fresh .....   | 11,200        | 280    | 11,600     | 290    | 21,200   | 530    | 190,939   | 5,542  |
| Squeteague .....    | 44,025        | 1,741  | 1,800      | 54     |          |        |           |        |
| Striped bass .....  | 17,400        | 1,270  | 43,450     | 2,875  | 6,000    | 360    | 1,770     | 140    |
| Suckers .....       | 700           | 19     | 3,700      | 69     | 700      | 21     | 950       | 30     |
| Sun-fish .....      | 1,800         | 72     |            |        |          |        |           |        |
| Crabs, soft .....   | 4,000         | 250    |            |        |          |        |           |        |
| Terrapin .....      |               |        |            |        | 220      | 200    |           |        |
| Total .....         | 222,870       | 8,352  | 253,405    | 7,550  | 104,670  | 1,990  | 390,167   | 7,672  |



278 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the seine catch of Maryland in 1897—Continued.

| Species.            | Cecil.    |         | Charles. |         | Dorchester. |        | Harford.  |         |
|---------------------|-----------|---------|----------|---------|-------------|--------|-----------|---------|
|                     | Lbs.      | Value.  | Lbs.     | Value.  | Lbs.        | Value. | Lbs.      | Value.  |
| Shore fisheries:    |           |         |          |         |             |        |           |         |
| Alewives, fresh...  | 607,600   | \$3,985 | 450,000  | \$1,625 | 75,000      | \$438  | 1,548,600 | \$7,524 |
| Alewives, salted... | 1,140,400 | 8,866   | 240,000  | 1,500   |             |        | 3,279,740 | 31,898  |
| Alewives, smoked... |           |         |          |         |             |        | 3,360     | 120     |
| Black bass          | 4,020     | 394     |          |         |             |        | 100       | 10      |
| Blue-fish           |           |         | 350      | 12      | 6,300       | 252    | 2,150     | 107     |
| Carp                | 2,600     | 60      | 820      | 25      |             |        | 3,080     | 98      |
| Cat-fish            | 3,000     | 113     | 6,750    | 168     | 1,375       | 34     | 1,000     | 20      |
| Eels                | 680       | 29      | 250      | 5       |             |        | 1,000     | 20      |
| Perch, white        | 6,100     | 304     | 29,025   | 1,238   | 3,425       | 144    | 1,900     | 79      |
| Perch, yellow       | 10,100    | 302     |          |         | 1,000       | 45     | 1,000     | 39      |
| Pike                | 6,000     | 584     |          |         | 200         | 15     | 100       | 7       |
| Shad, fresh         | 111,961   | 3,170   | 87,400   | 2,425   | 9,600       | 288    | 97,165    | 3,241   |
| Shad, salted        |           |         | 20,000   | 500     |             |        |           |         |
| Spots               |           |         |          |         | 600         | 48     |           |         |
| Squeteague          |           |         | 750      | 26      | 4,400       | 175    |           |         |
| Striped bass        | 55,180    | 4,837   | 34,945   | 1,561   | 4,700       | 386    | 49,738    | 3,135   |
| Suckers             | 4,300     | 85      |          |         | 700         | 14     | 800       | 16      |
| Sun-fish            | 850       | 30      |          |         |             |        | 150       | 2       |
| Total               | 1,952,791 | 22,759  | 870,290  | 9,085   | 107,300     | 1,839  | 4,989,883 | 46,316  |

| Species.           | Talbot. |        | Prince George. |         | Queene Anne. |        | St. Mary. |        |
|--------------------|---------|--------|----------------|---------|--------------|--------|-----------|--------|
|                    | Lbs.    | Value. | Lbs.           | Value.  | Lbs.         | Value. | Lbs.      | Value. |
| Shore fisheries:   |         |        |                |         |              |        |           |        |
| Alewives, fresh... | 16,320  | \$136  | 421,500        | \$1,928 | 14,760       | \$183  |           |        |
| Black bass         |         |        | 810            | 37      |              |        |           |        |
| Blue-fish          |         |        |                |         | 250          | 10     | 2,770     | 97     |
| Carp               |         |        | 3,765          | 136     | 780          | 20     |           |        |
| Cat-fish           | 240     | 10     | 34,680         | 1,330   | 5,260        | 201    | 1,750     | 38     |
| Croakers           |         |        |                |         | 2,350        | 56     |           |        |
| Eels               |         |        | 2,600          | 78      | 1,030        | 38     | 800       | 22     |
| Perch, white       | 400     | 20     | 17,530         | 896     | 4,638        | 302    | 18,200    | 728    |
| Perch, yellow      | 650     | 26     | 10,000         | 316     | 16,560       | 784    |           |        |
| Pike               |         |        | 2,000          | 121     | 1,440        | 116    |           |        |
| Shad, fresh        | 26,100  | 678    | 66,475         | 1,570   | 13,910       | 748    |           |        |
| Squeteague         |         |        |                |         |              |        | 5,825     | 230    |
| Striped bass       | 200     | 14     | 12,810         | 743     | 54,890       | 4,066  | 23,925    | 1,061  |
| Suckers            |         |        | 4,950          | 116     | 130          | 5      |           |        |
| Crabs, soft        |         |        |                |         | 122,192      | 7,515  |           |        |
| Total              | 43,910  | 884    | 577,120        | 7,271   | 238,190      | 14,044 | 53,270    | 2,191  |

| Species.           | Kent.   |        | Wicomico. |        | Worcester. |         | Total.     |          |
|--------------------|---------|--------|-----------|--------|------------|---------|------------|----------|
|                    | Lbs.    | Value. | Lbs.      | Value. | Lbs.       | Value.  | Lbs.       | Value.   |
| Shore fisheries:   |         |        |           |        |            |         |            |          |
| Alewives, fresh... | 5,200   | \$75   | 14,000    | \$93   | 408,000    | \$3,716 | 3,902,988  | \$21,446 |
| Alewives, salted   |         |        |           |        |            |         | 4,660,140  | 42,264   |
| Alewives, smoked   |         |        |           |        |            |         | 3,360      | 120      |
| Black bass         |         |        |           |        |            |         | 4,930      | 441      |
| Blue-fish          | 6,200   | 186    |           |        |            |         | 30,110     | 1,159    |
| Carp               | 3,000   | 90     |           |        |            |         | 79,065     | 2,964    |
| Cat-fish           | 7,900   | 268    | 2,400     | 88     | 4,600      | 143     | 116,235    | 3,854    |
| Croakers           | 450     | 18     |           |        | 1,800      | 90      | 19,750     | 655      |
| Eels               | 1,300   | 52     |           |        | 300        | 10      | 22,985     | 733      |
| Flounders          |         |        |           |        | 600        | 30      | 1,100      | 54       |
| Menhaden           |         |        |           |        | 73,500     | 138     | 73,500     | 138      |
| Mullet             |         |        |           |        | 1,500      | 60      | 1,500      | 60       |
| Perch, white       | 11,950  | 759    | 2,600     | 148    | 111,540    | 6,123   | 253,418    | 12,925   |
| Perch, yellow      | 1,350   | 54     | 300       | 12     | 1,500      | 63      | 98,450     | 3,133    |
| Pike               |         |        |           |        | 15,870     | 488     | 36,045     | 2,233    |
| Shad, fresh        | 3,300   | 144    | 7,500     | 375    | 11,138     | 432     | 669,488    | 19,713   |
| Shad, salted       |         |        |           |        |            |         | 20,000     | 600      |
| Spots              |         |        |           |        |            |         | 600        | 48       |
| Squeteague         | 400     | 12     |           |        | 22,100     | 864     | 99,300     | 3,102    |
| Striped bass       | 13,410  | 846    | 1,300     | 130    | 32,160     | 4,730   | 351,878    | 26,154   |
| Suckers            | 800     | 24     |           |        |            |         | 17,730     | 899      |
| Sun-fish           |         |        |           |        |            |         | 2,800      | 104      |
| Crabs, soft        | 76,080  | 5,166  |           |        |            |         | 202,272    | 12,931   |
| Terrapin           |         |        |           |        |            |         | 220        | 200      |
| Total              | 131,340 | 7,694  | 28,100    | 846    | 684,608    | 16,887  | 10,647,914 | 155,390  |

Table showing, by counties, the seine catch of Maryland in 1897—Continued.

| Species.                         | Kent.          |               | Wicomico.     |              | Worcester.     |                 | Total.            |                |
|----------------------------------|----------------|---------------|---------------|--------------|----------------|-----------------|-------------------|----------------|
|                                  | Lbs.           | Value.        | Lbs.          | Value.       | Lbs.           | Value.          | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>         |                |               |               |              |                |                 |                   |                |
| Blue-fish.....                   | 700            | \$23          |               |              |                |                 | 700               | \$23           |
| Cat-fish.....                    | 500            | 30            |               |              |                |                 | 500               | 30             |
| Eels.....                        | 100            | 4             |               |              |                |                 | 100               | 4              |
| Perch, white.....                | 2,064          | 182           |               |              |                |                 | 2,064             | 182            |
| Pike.....                        | 100            | 8             |               |              |                |                 | 100               | 8              |
| Squeteague.....                  | 840            | 21            |               |              |                |                 | 840               | 21             |
| Striped bass.....                | 37,500         | 2,370         |               |              |                |                 | 37,500            | 2,370          |
| Suckers.....                     | 200            | 4             |               |              |                |                 | 200               | 4              |
| <b>Total.....</b>                | <b>42,004</b>  | <b>2,642</b>  |               |              |                |                 | <b>42,004</b>     | <b>2,642</b>   |
| <b>Total shore and vessel...</b> | <b>173,344</b> | <b>10,336</b> | <b>28,100</b> | <b>\$846</b> | <b>684,608</b> | <b>\$16,887</b> | <b>10,689,918</b> | <b>158,022</b> |

Table showing, by counties, the gill-net catch in the shore fisheries of Maryland in 1897.

| Species.          | Anne Arundel. |              | Baltimore.    |            | Calvert.      |            | Caroline.      |               | Cecil.         |               |
|-------------------|---------------|--------------|---------------|------------|---------------|------------|----------------|---------------|----------------|---------------|
|                   | Lbs.          | Value.       | Lbs.          | Value.     | Lbs.          | Value.     | Lbs.           | Value.        | Lbs.           | Value.        |
| Alewives.....     | 41,000        | \$328        |               |            | 400           | \$6        | 13,920         | \$202         |                |               |
| Blue-fish.....    | 11,100        | 555          |               |            |               |            |                |               |                |               |
| Perch, white..... | 500           | 40           |               |            | 300           | 6          | 200            | 14            |                |               |
| Shad.....         | 12,000        | 300          | 6,000         | \$150      | 16,120        | 403        | 447,233        | 11,076        | 508,283        | \$13,631      |
| Striped bass..... | 2,300         | 180          | 9,800         | 616        | 800           | 39         | 6,042          | 472           | 17,220         | 1,231         |
| Sturgeon.....     |               |              |               |            | 350           | 15         |                |               |                |               |
| Caviar.....       |               |              |               |            | 40            | 14         |                |               |                |               |
| <b>Total.....</b> | <b>66,900</b> | <b>1,403</b> | <b>15,800</b> | <b>766</b> | <b>18,010</b> | <b>483</b> | <b>467,395</b> | <b>11,764</b> | <b>525,503</b> | <b>14,862</b> |

| Species.           | Charles.       |               | Dorchester.    |              | Harford.       |               | Kent.          |               |
|--------------------|----------------|---------------|----------------|--------------|----------------|---------------|----------------|---------------|
|                    | Lbs.           | Value.        | Lbs.           | Value.       | Lbs.           | Value.        | Lbs.           | Value.        |
| Alewives.....      | 118,000        | \$662         | 29,800         | \$209        | 24,000         | \$254         | 88,800         | \$1,286       |
| Blue-fish.....     |                |               | 1,300          | 46           |                |               |                |               |
| Perch, white.....  | 1,250          | 75            |                |              | 14,140         | 918           | 108,800        | 6,993         |
| Perch, yellow..... |                |               |                |              |                |               | 11,000         | 550           |
| Pike.....          |                |               |                |              | 1,430          | 122           |                |               |
| Shad.....          | 560,996        | 10,710        | 189,069        | 6,819        | 331,868        | 8,283         | 467,910        | 11,481        |
| Squeteague.....    |                |               | 700            | 17           |                |               |                |               |
| Striped bass.....  | 6,850          | 414           | 300            | 36           | 54,740         | 4,432         | 131,430        | 8,545         |
| Sturgeon.....      | 12,984         | 628           | 41,040         | 1,619        |                |               |                |               |
| Caviar.....        | 954            | 420           |                |              |                |               |                |               |
| <b>Total.....</b>  | <b>701,034</b> | <b>12,909</b> | <b>262,209</b> | <b>8,746</b> | <b>426,178</b> | <b>14,009</b> | <b>807,940</b> | <b>28,855</b> |

| Species.              | Prince George. |              | Queen Anne.   |              | St. Mary.     |              | Somerset.     |            |
|-----------------------|----------------|--------------|---------------|--------------|---------------|--------------|---------------|------------|
|                       | Lbs.           | Value.       | Lbs.          | Value.       | Lbs.          | Value.       | Lbs.          | Value.     |
| Alewives.....         |                |              | 47,600        | \$486        |               |              |               |            |
| Blue-fish.....        |                |              |               |              | 14,000        | \$560        | 17,090        | \$388      |
| Perch, white.....     | 1,000          | \$40         |               |              |               |              |               |            |
| Shad.....             | 102,170        | 1,948        | 34,884        | 1,297        |               |              | 10,715        | 467        |
| Spanish mackerel..... |                |              |               |              | 5,187         | 415          |               |            |
| Squeteague.....       |                |              |               |              | 1,425         | 50           | 650           | 10         |
| Striped bass.....     | 1,205          | 72           |               |              |               |              |               |            |
| <b>Total.....</b>     | <b>104,375</b> | <b>2,060</b> | <b>82,484</b> | <b>1,783</b> | <b>20,612</b> | <b>1,025</b> | <b>28,455</b> | <b>865</b> |

| Species.              | Talbot.        |              | Wicomico.      |               | Worcester.     |               | Total.           |                |
|-----------------------|----------------|--------------|----------------|---------------|----------------|---------------|------------------|----------------|
|                       | Lbs.           | Value.       | Lbs.           | Value.        | Lbs.           | Value.        | Lbs.             | Value.         |
| Alewives.....         | 40,040         | \$436        | 63,332         | \$556         | 184,200        | \$847         | 651,092          | \$5,272        |
| Blue-fish.....        | 60,120         | 2,387        |                |               |                |               | 103,610          | 3,936          |
| Cat-fish.....         |                |              | 1,400          | 70            |                |               | 1,400            | 70             |
| Perch, white.....     |                |              | 3,000          | 177           | 90,125         | 5,790         | 219,315          | 14,053         |
| Perch, yellow.....    |                |              | 250            | 6             |                |               | 11,250           | 556            |
| Pike.....             |                |              | 400            | 40            | 2,000          | 65            | 3,830            | 227            |
| Shad.....             | 242,757        | 6,177        | 290,303        | 12,166        | 6,675          | 244           | 3,226,983        | 85,152         |
| Spanish mackerel..... | 2,400          | 212          |                |               |                |               | 7,587            | 627            |
| Squeteague.....       | 7,450          | 294          |                |               | 1,200          | 48            | 11,425           | 419            |
| Striped bass.....     | 5,930          | 467          | 450            | 45            | 44,780         | 6,235         | 281,847          | 22,784         |
| Sturgeon.....         |                |              | 78,485         | 2,251         |                |               | 132,859          | 4,513          |
| Suckers.....          |                |              | 2,000          | 40            |                |               | 2,000            | 40             |
| Caviar.....           |                |              |                |               |                |               | 994              | 434            |
| <b>Total.....</b>     | <b>358,697</b> | <b>9,973</b> | <b>439,620</b> | <b>15,351</b> | <b>328,980</b> | <b>13,229</b> | <b>4,654,192</b> | <b>138,083</b> |

Table showing, by counties, the pound net, trap net, and weir catch in the shore fisheries of Maryland in 1897.

| Species.               | Anne Arundel. |         | Baltimore. |        | Calvert. |         | Caroline. |        | Cecil.    |         |
|------------------------|---------------|---------|------------|--------|----------|---------|-----------|--------|-----------|---------|
|                        | Lbs.          | Value.  | Lbs.       | Value. | Lbs.     | Value.  | Lbs.      | Value. | Lbs.      | Value.  |
| Alewives, fresh .....  | 844,000       | \$3,818 | 51,667     | \$197  | 563,500  | \$3,261 | 60,460    | \$555  | 1,286,400 | \$4,767 |
| Alewives, salted ..... | 3,000         | 72      |            |        |          |         |           |        | 644,960   | 7,100   |
| Blue-fish .....        | 745           | 31      | 100        | 4      | 4,175    | 170     |           |        |           |         |
| Carp .....             | 410           | 16      | 1,700      | 51     | 2,450    | 73      | 500       | 15     | 2,500     | 51      |
| Cat-fish .....         | 720           | 36      | 8,090      | 188    | 1,200    | 41      | 4,850     | 188    | 28,645    | 978     |
| Croakers .....         |               |         |            |        | 19,700   | 296     |           |        |           |         |
| Eels .....             | 5,750         | 238     | 3,613      | 107    | 400      | 13      | 400       | 16     | 7,050     | 257     |
| Flounders .....        |               |         |            |        | 6,650    | 269     |           |        |           |         |
| Menhaden .....         | 25,200        | 42      |            |        |          |         |           |        |           |         |
| Perch, white .....     | 2,200         | 135     | 4,110      | 206    | 4,350    | 174     | 3,100     | 185    | 48,007    | 2,482   |
| Perch, yellow .....    |               |         | 18,735     | 443    | 630      | 19      | 3,410     | 180    | 84,110    | 2,544   |
| Pike .....             | 120           | 5       | 6,776      | 659    |          |         | 830       | 59     | 6,912     | 554     |
| Shad .....             | 148,175       | 4,297   | 13,200     | 330    | 122,800  | 2,583   | 18,224    | 507    | 53,208    | 1,783   |
| Squeteague .....       | 1,450         | 58      | 1,500      | 45     | 15,200   | 456     |           |        |           |         |
| Striped bass .....     | 5,250         | 420     | 12,680     | 888    | 35,300   | 2,420   | 1,560     | 104    | 10,070    | 954     |
| Suckers .....          |               |         | 1,300      | 26     |          |         | 2,300     | 65     | 6,800     | 139     |
| Total .....            | 1,037,020     | 9,168   | 123,471    | 3,144  | 776,355  | 9,775   | 95,634    | 1,874  | 2,178,662 | 21,609  |

| Species.               | Charles. |         | Dorchester. |         | Harford. |        | Kent.   |         |
|------------------------|----------|---------|-------------|---------|----------|--------|---------|---------|
|                        | Lbs.     | Value.  | Lbs.        | Value.  | Lbs.     | Value. | Lbs.    | Value.  |
| Alewives, fresh .....  | 585,000  | \$3,049 | 1,015,284   | \$6,987 | 109,920  | \$790  | 614,160 | \$3,385 |
| Alewives, salted ..... | 8,000    | 80      |             |         |          |        | 92,800  | 1,160   |
| Blue-fish .....        | 1,000    | 36      |             |         |          |        | 1,500   | 60      |
| Cat-fish .....         | 26,380   | 712     | 32,850      | 916     | 12,017   | 376    | 16,400  | 641     |
| Croakers .....         | 1,000    | 20      | 7,250       | 170     |          |        |         |         |
| Drum .....             |          |         | 400         | 4       |          |        |         |         |
| Eels .....             | 250      | 7       | 6,160       | 244     | 1,430    | 48     | 4,280   | 160     |
| Flounders .....        | 300      | 6       | 1,625       | 63      |          |        |         |         |
| Menhaden .....         |          |         | 5,000       | 5       |          |        |         |         |
| Perch, white .....     | 23,583   | 1,282   | 23,500      | 1,353   | 9,180    | 466    | 41,300  | 2,192   |
| Perch, yellow .....    | 11,150   | 279     | 7,875       | 235     | 11,600   | 289    | 7,100   | 287     |
| Pike .....             |          |         | 1,733       | 138     | 313      | 25     | 2,150   | 168     |
| Shad .....             | 87,336   | 1,690   | 250,421     | 8,438   | 3,328    | 144    | 61,883  | 1,783   |
| Squeteague .....       | 875      | 35      | 1,450       | 50      |          |        | 1,500   | 60      |
| Striped bass .....     | 32,269   | 1,694   | 22,262      | 1,606   | 890      | 85     | 17,259  | 1,267   |
| Sturgeon .....         |          |         | 1,175       | 41      |          |        |         |         |
| Suckers .....          |          |         | 2,470       | 68      | 1,000    | 23     | 550     | 17      |
| Total .....            | 777,143  | 8,890   | 1,379,455   | 20,318  | 149,678  | 2,246  | 860,882 | 11,180  |

| Species.               | Prince George. |        | Queen Anne. |         | St. Mary. |          | Somerset. |        |
|------------------------|----------------|--------|-------------|---------|-----------|----------|-----------|--------|
|                        | Lbs.           | Value. | Lbs.        | Value.  | Lbs.      | Value.   | Lbs.      | Value. |
| Alewives, fresh .....  | 108,200        | \$554  | 324,800     | \$2,069 | 605,468   | \$10,249 | 134,200   | \$605  |
| Blue-fish .....        |                |        | 7,400       | 222     | 6,628     | 262      | 7,200     | 235    |
| Butter-fish .....      |                |        |             |         |           |          | 400       | 3      |
| Carp .....             | 200            | 10     | 600         | 21      | 5,290     | 139      |           |        |
| Cat-fish .....         | 4,450          | 142    | 3,000       | 103     | 5,925     | 122      | 3,300     | 90     |
| Croakers .....         |                |        |             |         | 9,415     | 178      | 163,000   | 1,085  |
| Drum .....             |                |        |             |         |           |          | 32,000    | 274    |
| Eels .....             |                |        | 16,600      | 693     | 200       | 6        | 1,066     | 52     |
| Flounders .....        |                |        |             |         | 10,132    | 428      | 1,500     | 30     |
| Hickory shad .....     |                |        |             |         | 3,752     | 53       |           |        |
| Menhaden .....         |                |        |             |         | 180,000   | 90       | 69,400    | 90     |
| Perch, white .....     | 4,025          | 236    | 10,050      | 562     | 10,324    | 396      | 4,400     | 22     |
| Perch, yellow .....    | 2,400          | 66     | 2,200       | 92      | 3,850     | 77       |           |        |
| Pike .....             | 300            | 30     | 50          | 4       |           |          |           |        |
| Pompano .....          |                |        |             |         |           |          | 110       | 11     |
| Shad .....             | 17,537         | 340    | 68,375      | 2,372   | 254,085   | 5,308    | 38,700    | 1,112  |
| Spanish mackerel ..... |                |        |             |         | 775       | 62       | 600       | 48     |
| Spots .....            |                |        |             |         | 1,128     | 39       |           |        |
| Squeteague .....       |                |        | 6,100       | 183     | 19,334    | 678      | 72,800    | 674    |
| Striped bass .....     | 3,675          | 221    | 23,917      | 1,903   | 22,429    | 1,345    | 3,895     | 202    |
| Sturgeon .....         |                |        |             |         | 3,800     | 135      | 735       | 27     |
| Suckers .....          | 600            | 12     |             |         |           |          |           |        |
| Caviar .....           |                |        |             |         | 600       | 210      |           |        |
| Total .....            | 141,387        | 1,611  | 463,092     | 8,224   | 1,143,135 | 19,777   | 533,306   | 4,560  |

Table showing, by counties, the pound net, trap net, and weir catch in the shore fisheries of Maryland in 1897—Continued.

| Species.               | Talbot. |         | Wicomico. |         | Worcester. |        | Total.     |          |
|------------------------|---------|---------|-----------|---------|------------|--------|------------|----------|
|                        | Lbs.    | Value.  | Lbs.      | Value.  | Lbs.       | Value. | Lbs.       | Value.   |
| Alewives, fresh .....  | 393,440 | \$2,536 | 276,300   | \$1,353 |            |        | 6,972,799  | \$44,175 |
| Alewives, salted ..... |         |         |           |         |            |        | 748,760    | 8,412    |
| Blue-fish .....        | 3,200   | 128     |           |         | 2,000      | \$80   | 33,948     | 1,228    |
| Bonito .....           |         |         |           |         | 1,000      | 50     | 1,000      | 50       |
| Butter-fish .....      |         |         |           |         | 86,000     | 2,320  | 86,400     | 2,323    |
| Carp .....             |         |         |           |         |            |        | 13,650     | 376      |
| Cat-fish .....         | 18,250  | 508     | 4,150     | 166     |            |        | 170,227    | 5,207    |
| Cero .....             |         |         |           |         | 1,000      | 50     | 1,000      | 50       |
| Croakers .....         | 880     | 27      |           |         | 2,400      | 72     | 203,645    | 1,848    |
| Drum .....             |         |         |           |         | 10,500     | 105    | 42,900     | 383      |
| Eels .....             | 4,900   | 155     | 400       | 22      |            |        | 52,499     | 2,018    |
| Flounders .....        | 900     | 36      | 550       | 24      | 1,200      | 42     | 22,857     | 898      |
| Hickory shad .....     |         |         |           |         |            |        | 3,752      | 53       |
| King-fish .....        |         |         |           |         | 1,000      | 35     | 1,000      | 35       |
| Menhaden .....         |         |         |           |         |            |        | 279,600    | 227      |
| Perch, white .....     | 26,780  | 1,155   | 2,400     | 205     |            |        | 217,309    | 11,051   |
| Perch, yellow .....    | 7,400   | 334     | 1,200     | 52      |            |        | 161,660    | 4,897    |
| Pike .....             | 2,130   | 148     | 324       | 32      |            |        | 21,638     | 1,822    |
| Pompano .....          |         |         |           |         | 200        | 24     | 310        | 35       |
| Shad .....             | 459,188 | 14,175  | 140,910   | 4,441   | 750        | 28     | 1,738,120  | 49,331   |
| Spanish mackerel ..... |         |         |           |         | 800        | 96     | 2,175      | 206      |
| Spots .....            |         |         |           |         | 1,200      | 52     | 2,328      | 91       |
| Squeteague .....       | 1,800   | 72      | 100       | 3       | 272,000    | 5,440  | 394,109    | 7,754    |
| Striped bass .....     | 11,920  | 802     | 2,950     | 246     |            |        | 206,326    | 14,157   |
| Sturgeon .....         |         |         | 2,500     | 72      | 4,500      | 220    | 12,710     | 495      |
| Suckers .....          | 1,200   | 26      | 1,000     | 20      |            |        | 17,220     | 396      |
| Caviar .....           |         |         |           |         |            |        | 600        | 210      |
| Total .....            | 931,988 | 20,102  | 432,784   | 6,636   | 384,550    | 8,614  | 11,408,542 | 157,728  |

Table showing, by counties, the fyke-net catch in the shore fisheries of Maryland in 1897.

| Species.            | Anne Arundel. |        | Baltimore. |        | Caroline. |        | Cecil.  |        |
|---------------------|---------------|--------|------------|--------|-----------|--------|---------|--------|
|                     | Lbs.          | Value. | Lbs.       | Value. | Lbs.      | Value. | Lbs.    | Value. |
| Alewives .....      | 2,000         | \$12   | 14,800     | \$38   | 2,552     | \$23   | 14,440  | \$95   |
| Black bass .....    |               |        |            |        |           |        | 1,260   | 126    |
| Carp .....          |               |        | 290        | 9      | 130       | 4      | 1,000   | 30     |
| Cat-fish .....      | 5,350         | 257    | 15,110     | 302    | 1,800     | 71     | 44,000  | 1,632  |
| Eels .....          |               |        | 3,790      | 77     | 750       | 29     | 10,250  | 352    |
| Perch, white .....  | 2,200         | 148    | 13,904     | 696    | 4,670     | 212    | 124,180 | 5,159  |
| Perch, yellow ..... |               |        | 51,165     | 1,023  | 3,410     | 181    | 36,550  | 1,160  |
| Pike .....          | 1,350         | 70     | 24,722     | 2,327  | 700       | 54     | 5,880   | 468    |
| Shad .....          |               |        |            |        | 1,200     | 34     | 2,922   | 84     |
| Striped bass .....  |               |        | 390        | 27     | 760       | 60     | 2,670   | 222    |
| Suckers .....       |               |        | 4,300      | 86     | 1,130     | 34     | 14,000  | 296    |
| Turtles .....       |               |        |            |        |           |        | 1,400   | 49     |
| Total .....         | 10,900        | 487    | 128,471    | 4,585  | 17,102    | 702    | 258,552 | 9,673  |

| Species.            | Dorchester. |        | Harford. |        | Kent.   |        | Queen Anne. |        |
|---------------------|-------------|--------|----------|--------|---------|--------|-------------|--------|
|                     | Lbs.        | Value. | Lbs.     | Value. | Lbs.    | Value. | Lbs.        | Value. |
| Alewives .....      | 2,400       | \$93   |          |        | 70,400  | \$768  | 9,600       | \$117  |
| Black bass .....    |             |        | 275      | \$22   |         |        |             |        |
| Carp .....          |             |        |          |        |         |        | 15,800      | 410    |
| Cat-fish .....      | 11,200      | 491    | 34,560   | 1,307  | 20,500  | 676    | 38,550      | 883    |
| Croakers .....      |             |        |          |        | 400     | 18     |             |        |
| Eels .....          |             |        | 5,000    | 182    | 925     | 32     |             |        |
| Perch, white .....  | 1,750       | 151    | 21,960   | 1,116  | 14,850  | 913    | 4,400       | 236    |
| Perch, yellow ..... | 500         | 5      | 5,000    | 150    | 9,750   | 486    | 6,800       | 330    |
| Pike .....          | 800         | 64     | 2,835    | 224    | 9,360   | 705    | 300         | 25     |
| Shad .....          | 500         | 14     |          |        | 11,615  | 325    | 1,307       | 56     |
| Striped bass .....  | 1,050       | 84     | 1,280    | 64     | 2,310   | 177    | 1,550       | 127    |
| Suckers .....       | 850         | 25     | 6,400    | 108    | 850     | 25     | 2,700       | 70     |
| Terrapins .....     | 2,898       | 1,545  |          |        |         |        |             |        |
| Turtles .....       | 1,300       | 65     |          |        |         |        |             |        |
| Total .....         | 23,248      | 2,537  | 77,310   | 3,173  | 140,960 | 4,125  | 81,007      | 2,254  |

## 282 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the fyke-net catch in the shore fisheries of Maryland in 1897—  
Continued.

| Species.           | Somerset. |        | Talbot. |        | Wicomico. |        | Total.  |         |
|--------------------|-----------|--------|---------|--------|-----------|--------|---------|---------|
|                    | Lbs.      | Value. | Lbs.    | Value. | Lbs.      | Value. | Lbs.    | Value.  |
| Alewives.....      | 5,400     | \$60   | 5,920   | \$78   | 72,808    | \$480  | 200,320 | \$1,764 |
| Black bass.....    |           |        |         |        |           |        | 1,535   | 148     |
| Blue-fish.....     |           |        |         |        | 100       | 6      | 100     | 6       |
| Butter-fish.....   |           |        |         |        | 640       | 25     | 640     | 25      |
| Carp.....          |           |        |         |        |           |        | 17,220  | 453     |
| Cat-fish.....      | 5,835     | 220    | 3,400   | 118    | 35,104    | 1,411  | 215,409 | 7,368   |
| Croakers.....      |           |        |         |        |           |        | 400     | 18      |
| Eels.....          |           |        | 1,600   | 62     | 2,050     | 125    | 24,365  | 859     |
| Flounders.....     | 200       | 10     |         |        | 2,900     | 129    | 3,100   | 139     |
| Perch, white.....  | 7,485     | 310    | 1,600   | 93     | 19,130    | 1,407  | 216,129 | 10,441  |
| Perch, yellow..... |           |        | 700     | 35     | 7,950     | 245    | 121,825 | 3,615   |
| Pike.....          |           |        | 280     | 19     | 4,650     | 461    | 50,877  | 4,417   |
| Shad.....          | 8,420     | 334    | 1,350   | 38     | 18,339    | 598    | 45,653  | 1,483   |
| Squeteague.....    |           |        |         |        | 605       | 40     | 605     | 40      |
| Striped bass.....  | 1,830     | 146    | 1,300   | 94     | 13,326    | 1,096  | 26,466  | 2,097   |
| Suckers.....       |           |        | 200     | 6      | 5,950     | 122    | 36,380  | 772     |
| Terrapins.....     |           |        |         |        | 939       | 148    | 3,837   | 1,693   |
| Turtles.....       |           |        |         |        | 740       | 44     | 3,440   | 158     |
| Total.....         | 29,170    | 1,080  | 16,350  | 543    | 185,231   | 6,337  | 968,301 | 35,496  |

Table showing, by counties, the catch of minor nets in the shore fisheries of Maryland in 1897.

| Species.         | Anne Arundel. |         | Baltimore. |        | Cecil. |        | Charles. |        |
|------------------|---------------|---------|------------|--------|--------|--------|----------|--------|
|                  | Lbs.          | Value.  | Lbs.       | Value. | Lbs.   | Value. | Lbs.     | Value. |
| Shad.....        |               |         |            |        | 3,907  | \$156  |          |        |
| Crabs, soft..... | 150,461       | \$8,148 |            |        |        |        |          |        |
| Shrimp.....      |               |         | 1,020      | \$510  |        |        |          |        |
| Crawfish.....    |               |         |            |        |        |        | 833      | \$75   |
| Terrapin.....    | 20            | 23      |            |        |        |        |          |        |
| Total.....       | 150,481       | 8,171   | 1,020      | 510    | 3,907  | 156    | 833      | 75     |

| Species.         | Dorchester. |         | Prince George. |        | St. Mary. |        | Somerset. |         |
|------------------|-------------|---------|----------------|--------|-----------|--------|-----------|---------|
|                  | Lbs.        | Value.  | Lbs.           | Value. | Lbs.      | Value. | Lbs.      | Value.  |
| Shad.....        |             |         |                |        |           |        | 41,475    | \$1,158 |
| Crabs, soft..... | 36,000      | \$1,620 |                |        | 18,000    | \$675  | 126,051   | 4,881   |
| Crabs, hard..... |             |         |                |        |           |        | 333       | 2       |
| Crawfish.....    |             |         | 2,075          | \$187  |           |        |           |         |
| Terrapin.....    | 754         | 360     |                |        |           |        | 1,143     | 850     |
| Total.....       | 36,754      | 1,980   | 2,075          | 187    | 18,000    | 675    | 169,002   | 6,891   |

| Species.           | Talbot. |         | Wicomico. |        | Worcester. |         | Total.  |        |
|--------------------|---------|---------|-----------|--------|------------|---------|---------|--------|
|                    | Lbs.    | Value.  | Lbs.      | Value. | Lbs.       | Value.  | Lbs.    | Value. |
| Cat-fish.....      |         |         | 700       | \$31   |            |         | 700     | \$31   |
| Perch, white.....  |         |         | 2,200     | 220    |            |         | 2,200   | 220    |
| Perch, yellow..... |         |         | 500       | 15     |            |         | 500     | 15     |
| Shad.....          |         |         |           |        | 53,937     | \$1,872 | 99,319  | 3,186  |
| Striped bass.....  |         |         | 500       | 50     |            |         | 500     | 50     |
| Suckers.....       |         |         | 300       | 6      |            |         | 300     | 6      |
| Crabs, soft.....   | 67,333  | \$4,040 |           |        |            |         | 397,845 | 19,364 |
| Crabs, hard.....   |         |         |           |        |            |         | 333     | 2      |
| Shrimp.....        |         |         |           |        |            |         | 1,020   | 510    |
| Crawfish.....      |         |         |           |        |            |         | 2,908   | 262    |
| Terrapin.....      |         |         | 1,292     | 100    |            |         | 3,209   | 1,333  |
| Total.....         | 67,333  | 4,040   | 5,492     | 422    | 53,937     | 1,872   | 508,834 | 24,979 |

Table showing, by counties, the trammel-net catch in the shore fisheries of Maryland in 1897.

| Species.            | Anne Arundel. |        | Cecil. |        | Dorchester. |        | Hartford. |        | Total. |        |
|---------------------|---------------|--------|--------|--------|-------------|--------|-----------|--------|--------|--------|
|                     | Lbs.          | Value. | Lbs.   | Value. | Lbs.        | Value. | Lbs.      | Value. | Lbs.   | Value. |
| Black bass .....    |               |        |        |        |             |        | 300       | \$24   | 300    | \$24   |
| Carp .....          | 250           | \$10   |        |        |             |        | 740       | 22     | 990    | 32     |
| Cat-fish .....      | 500           | 25     | 1,000  | \$40   | 800         | \$12   | 1,600     | 64     | 3,900  | 141    |
| Perch, white .....  | 7,000         | 560    | 1,500  | 75     | 500         | 35     | 2,150     | 86     | 11,150 | 756    |
| Perch, yellow ..... | 550           | 22     | 1,000  | 40     | 500         | 5      |           |        | 2,050  | 67     |
| Pike .....          | 600           | 24     | 900    | 81     | 500         | 40     | 220       | 17     | 2,220  | 162    |
| Striped bass .....  |               |        | 400    | 32     |             |        | 26,180    | 2,093  | 26,580 | 2,125  |
| Suckers .....       |               |        |        |        |             |        | 9,200     | 184    | 9,200  | 184    |
| Sun-fish .....      | 1,200         | 48     |        |        |             |        |           |        | 1,200  | 48     |
| Total .....         | 10,100        | 689    | 4,800  | 268    | 2,300       | 92     | 40,390    | 2,490  | 57,590 | 3,539  |

Table showing, by counties, the line catch of Maryland in 1897.

| Species.           | Anne Arundel. |         | Baltimore. |        | Charles. |        | Dorchester. |        | Harford. |        |
|--------------------|---------------|---------|------------|--------|----------|--------|-------------|--------|----------|--------|
|                    | Lbs.          | Value.  | Lbs.       | Value. | Lbs.     | Value. | Lbs.        | Value. | Lbs.     | Value. |
| Vessel fisheries:  |               |         |            |        |          |        |             |        |          |        |
| Blue-fish .....    |               |         | 4,000      | \$140  |          |        |             |        |          |        |
| Sea bass .....     |               |         | 8,000      | 280    |          |        |             |        |          |        |
| Total .....        |               |         | 12,000     | 420    |          |        |             |        |          |        |
| Shore fisheries:   |               |         |            |        |          |        |             |        |          |        |
| Blue-fish .....    |               |         |            |        |          |        | 500         | \$20   |          |        |
| Cat-fish .....     |               |         |            |        |          |        | 9,100       | 367    | 5,250    | \$212  |
| Perch, white ..... |               |         |            |        |          |        |             |        | 3,960    | 335    |
| Sheepshead .....   |               |         |            |        |          |        | 200         | 12     |          |        |
| Squeteague .....   |               |         |            |        |          |        | 1,000       | 20     |          |        |
| Striped bass ..... |               |         |            |        |          |        |             |        | 350      | 35     |
| Crabs, hard .....  | 220,200       | \$1,685 |            |        | 5,600    | \$36   | 1,356,250   | 10,635 |          |        |
| Total .....        | 220,200       | 1,685   |            |        | 5,600    | 36     | 1,367,050   | 11,054 | 9,560    | 582    |

| Species.           | Kent.   |        | Queen Anne. |        | St. Mary. |        | Somerset. |        |
|--------------------|---------|--------|-------------|--------|-----------|--------|-----------|--------|
|                    | Lbs.    | Value. | Lbs.        | Value. | Lbs.      | Value. | Lbs.      | Value. |
| Shore fisheries:   |         |        |             |        |           |        |           |        |
| Blue-fish .....    |         |        |             |        |           |        | 900       | \$28   |
| Cat-fish .....     | 18,500  | \$740  |             |        |           |        | 100       | 4      |
| Croakers .....     |         |        |             |        |           |        | 700       | 14     |
| Drum .....         |         |        |             |        |           |        | 100       | 3      |
| Flounders .....    |         |        |             |        |           |        | 300       | 6      |
| Squeteague .....   |         |        |             |        |           |        | 14,500    | 574    |
| Striped bass ..... |         |        | 3,900       | \$273  |           |        |           |        |
| Crabs, hard .....  | 282,533 | 3,232  | 528,440     | 3,906  | 75,833    | \$600  | 415,767   | 3,444  |
| Total .....        | 301,033 | 3,972  | 532,340     | 4,179  | 75,833    | 600    | 432,367   | 4,073  |

| Species.           | Talbot.   |         | Wicomico. |         | Worcester. |        | Total.    |        |
|--------------------|-----------|---------|-----------|---------|------------|--------|-----------|--------|
|                    | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.       | Value. | Lbs.      | Value. |
| Vessel fisheries:  |           |         |           |         |            |        |           |        |
| Blue-fish .....    |           |         |           |         |            |        | 4,000     | \$140  |
| Sea bass .....     |           |         |           |         |            |        | 8,000     | 280    |
| Total .....        |           |         |           |         |            |        | 12,000    | 420    |
| Shore fisheries:   |           |         |           |         |            |        |           |        |
| Blue-fish .....    |           |         |           |         | 12,840     | \$616  | 14,240    | 664    |
| Cat-fish .....     |           |         | 36,650    | \$1,620 |            |        | 69,600    | 2,943  |
| Croakers .....     |           |         |           |         | 11,800     | 354    | 12,500    | 368    |
| Drum .....         |           |         |           |         |            |        | 100       | 3      |
| Eels .....         |           |         | 500       | 30      |            |        | 500       | 30     |
| Flounders .....    |           |         |           |         |            |        | 300       | 6      |
| Perch, white ..... |           |         |           |         |            |        | 3,960     | 335    |
| Sheepshead .....   |           |         |           |         |            |        | 200       | 12     |
| Sea bass .....     |           |         |           |         | 8,200      | 410    | 8,200     | 410    |
| Squeteague .....   |           |         |           |         | 95,400     | 2,862  | 110,900   | 3,456  |
| Striped bass ..... |           |         |           |         |            |        | 4,250     | 308    |
| Crabs, soft .....  | 82,709    | \$1,518 |           |         |            |        | 82,709    | 1,518  |
| Crabs, hard .....  | 2,231,798 | 14,511  |           |         |            |        | 5,116,416 | 38,049 |
| Turtle .....       |           |         | 2,025     | 131     |            |        | 2,025     | 131    |
| Total .....        | 2,314,502 | 16,029  | 39,175    | 1,781   | 128,240    | 4,242  | 5,425,900 | 48,233 |



Table showing the catch of eels by pots and spears in Maryland in 1897.

| Counties.         | Lbs.   | Value. | Counties.         | Lbs.    | Value.  |
|-------------------|--------|--------|-------------------|---------|---------|
| Shore fisheries:  |        |        | Shore fisheries:  |         |         |
| Anne Arundel..... | 19,200 | \$730  | Somerset.....     | 34,210  | \$1,081 |
| Baltimore.....    | 13,225 | 265    | Talbot.....       | 11,600  | 376     |
| Calvert.....      | 940    | 28     | Wicomico.....     | 6,400   | 254     |
| Cecil.....        | 53,850 | 1,600  | Worcester.....    | 11,200  | 482     |
| Charles.....      | 3,700  | 180    | Total.....        | 245,295 | 8,600   |
| Dorchester.....   | 22,750 | 910    |                   |         |         |
| Harford.....      | 44,930 | 1,733  | Vessel fisheries: |         |         |
| Kent.....         | 4,100  | 116    | Dorchester.....   | 61,000  | 2,440   |
| Queen Anne.....   | 14,990 | 635    |                   |         |         |
| St. Mary.....     | 4,200  | 210    |                   |         |         |

NOTE.—All taken with pots except 30,000 pounds, \$900, speared in Somerset County.

Table showing the catch by dredges in Maryland in 1897.

| Counties.         | Oysters.   |           | Crabs, soft. |         | Crabs, hard. |        |
|-------------------|------------|-----------|--------------|---------|--------------|--------|
|                   | Lbs.       | Value.    | Lbs.         | Value.  | Lbs.         | Value. |
| Vessel fisheries: |            |           |              |         |              |        |
| Anne Arundel..... | 205,450    | \$12,149  |              |         |              |        |
| Baltimore.....    | 3,292,310  | 237,207   |              |         |              |        |
| Calvert.....      | 253,680    | 18,063    |              |         |              |        |
| Charles.....      | 24,500     | 1,225     |              |         |              |        |
| Dorchester.....   | 5,403,650  | 269,806   | 16,900       | \$760   |              |        |
| St. Mary.....     | 127,085    | 7,262     |              |         |              |        |
| Somerset.....     | 4,864,846  | 269,587   | 102,717      | 4,552   | 15,867       | \$142  |
| Talbot.....       | 2,631,811  | 121,177   |              |         |              |        |
| Wicomico.....     | 111,790    | 6,575     |              |         |              |        |
| Total.....        | 16,915,122 | 943,051   | 119,617      | 5,312   | 15,867       | 142    |
| Shore fisheries:  |            |           |              |         |              |        |
| Anne Arundel..... | 124,600    | 8,053     |              |         |              |        |
| Baltimore.....    | 7,700      | 440       |              |         |              |        |
| Calvert.....      | 191,450    | 13,675    |              |         |              |        |
| Charles.....      | 47,250     | 2,363     |              |         |              |        |
| Dorchester.....   | 2,059,610  | 101,291   | 146,867      | 6,596   |              |        |
| St. Mary.....     | 342,090    | 19,870    |              |         |              |        |
| Somerset.....     | 1,827,406  | 105,775   | 3,166,569    | 131,916 | 200,700      | 1,756  |
| Talbot.....       | 188,510    | 8,042     |              |         |              |        |
| Wicomico.....     | 28,735     | 1,634     |              |         |              |        |
| Total.....        | 4,817,351  | 261,143   | 3,313,436    | 138,512 | 200,700      | 1,756  |
| Grand total.....  | 21,732,473 | 1,204,194 | 3,433,053    | 143,824 | 216,567      | 1,898  |

Table showing the catch by tongs in Maryland in 1897.

| Counties.         | Oysters.   |           | Clams.  |         |
|-------------------|------------|-----------|---------|---------|
|                   | Lbs.       | Value.    | Lbs.    | Value.  |
| Vessel fisheries: |            |           |         |         |
| Anne Arundel..... | 167,734    | \$10,457  |         |         |
| Calvert.....      | 15,400     | 1,215     |         |         |
| Dorchester.....   | 23,912     | 900       |         |         |
| Somerset.....     | 11,900     | 635       |         |         |
| Wicomico.....     | 2,100      | 150       |         |         |
| Total.....        | 221,046    | 13,357    |         |         |
| Shore fisheries:  |            |           |         |         |
| Anne Arundel..... | 8,595,585  | 202,022   |         |         |
| Calvert.....      | 1,442,525  | 105,215   |         |         |
| Charles.....      | 452,480    | 25,559    |         |         |
| Dorchester.....   | 5,724,887  | 255,578   |         |         |
| Kent.....         | 2,325,834  | 140,625   |         |         |
| Queen Anne.....   | 2,725,821  | 122,953   |         |         |
| St. Mary.....     | 2,262,596  | 132,571   |         |         |
| Somerset.....     | 2,240,406  | 134,672   | 49,368  | \$3,780 |
| Talbot.....       | 4,235,553  | 203,217   |         |         |
| Wicomico.....     | 1,574,825  | 88,597    |         |         |
| Worcester.....    | *2,250,507 | 256,642   | 72,920  | 5,062   |
| Total.....        | 28,831,019 | 1,667,651 | 122,288 | 8,842   |
| Grand total.....  | 29,052,065 | 1,681,008 | 122,288 | 8,842   |

\* Includes 41,500 pounds of seed oysters.

## THE WHOLESALE FISHERY TRADE.

The wholesale fishery trade of Maryland, as here presented, embraces not only the handling of products of the local fisheries in a raw or unprepared condition, but also includes the oyster-canning industry, the opening of oysters and the shipment and sale of the edible part, the preparation of crab meat, the salting of alewives or other species, and the handling of fish, fresh or salted, or any other fishery products, at wholesale or on commission, regardless of the source from which they are derived. The persons and capital employed have also been included in the general fishery tables.

This trade is carried on to a greater or less extent in 25 localities on both sides of the Chesapeake and in 8 different counties. The number of firms engaged in the various branches of the trade was 235, the value of the shore property used was \$1,759,391, the cash or working capital amounted to \$1,615,285, and the number of persons employed, including proprietors, clerks, operatives, and laborers, was 15,788.

The products consisted of canned oysters valued at \$1,540,690, opened oysters valued at \$3,552,561, oysters sold in the shell valued at \$159,471, oyster shells and lime made from oyster shells valued at \$35,022, clams valued at \$8,576, crabs, hard and soft, and crab meat worth \$288,956, shrimp valued at \$328, terrapin and turtles of various species valued at \$43,444, fresh fish valued at \$742,557, and salted fish, which, with the exception of alewives, are chiefly the product of the New England fisheries, valued at \$292,682; the total value of the trade aggregating \$6,664,297. The great relative importance of the oyster trade is apparent when it is considered that \$5,287,744 of the above amount was received for oyster products.

The principal market is Baltimore, its trade being more than ten times as great as that of any other locality. This is due principally to the existence of a large oyster-canning industry and opened-oyster business. There is also an important commission trade in oysters. In addition to these branches large quantities of fresh fish and other fishery products from all sections of the State are handled, the aggregate value of the trade being \$5,189,832.

Crisfield and Cambridge rank next to Baltimore in importance. Cambridge surpasses Crisfield in the extent of its oyster business, but Crisfield is the most extensive market and shipping-point for soft crabs in the United States. The trade of Crisfield, including all products handled, aggregated \$427,285, and that of Cambridge \$376,804.

The following table shows by localities the extent of the wholesale trade in fishery products of Maryland in 1897.

Table showing the extent of the wholesale trade in fishery products of Maryland in 1897.

| Items.                       | Annapolis. |          | Baltimore. |             | Lapidum. |         | Havre de Grace and Perryville. |         |
|------------------------------|------------|----------|------------|-------------|----------|---------|--------------------------------|---------|
|                              | No.        | Value.   | No.        | Value.      | No.      | Value.  | No.                            | Value.  |
| Establishments .....         | 8          | \$19,675 | 105        | \$1,532,700 | 3        | \$3,130 | 3                              | \$4,150 |
| Cash capital .....           |            | 15,400   |            | 1,363,460   |          | 2,800   |                                | 3,700   |
| Persons engaged .....        | 349        |          | 11,686     |             | 53       |         | 23                             |         |
| Products handled:            |            |          |            |             |          |         |                                |         |
| Oysters—                     |            |          |            |             |          |         |                                |         |
| Canned.....1-lb. cans.....   |            |          | 11,399,867 | 710,695     |          |         |                                |         |
| Canned.....2-lb. cans.....   |            |          | 6,906,370  | 829,995     |          |         |                                |         |
| Opened.....gallons.....      | 71,992     | 46,460   | 2,882,475  | 2,434,201   |          |         |                                |         |
| In shell.....bushels.....    |            |          | 85,500     | 127,900     |          |         |                                |         |
| Shells.....do.....           | 29,168     | 364      | 2,486,000  | 6,577       |          |         |                                |         |
| Lime (made from shells),     |            |          |            |             |          |         |                                |         |
| bushels.....                 |            |          | 440,250    | 17,079      |          |         |                                |         |
| Clams.....number.....        |            |          | 416,000    | 1,332       |          |         |                                |         |
| Crabs—                       |            |          |            |             |          |         |                                |         |
| Hard.....do.....             | 175,000    | 526      | 1,025,000  | 4,125       |          |         |                                |         |
| Soft.....do.....             | 233,884    | 4,927    | 1,671,933  | 35,775      |          |         |                                |         |
| Crab meat.....pounds.....    | 29,400     | 3,519    | 28,416     | 3,789       |          |         |                                |         |
| Shrimp.....do.....           |            |          | 2,625      | 328         |          |         |                                |         |
| Terrapin—                    |            |          |            |             |          |         |                                |         |
| Diamond-back,number.....     |            |          | 3,988      | 14,487      |          |         |                                |         |
| Western.....do.....          |            |          | 6,744      | 1,400       |          |         |                                |         |
| Sliders.....do.....          |            |          | 61,550     | 1,210       |          |         |                                |         |
| Snapping turtles.....do..... |            |          | 38,610     | 1,610       |          |         |                                |         |
| Fish—                        |            |          |            |             |          |         |                                |         |
| Fresh.....pounds.....        |            |          | 17,976,875 | 715,058     |          |         | 549,296                        | 17,314  |
| Salted.....do.....           |            |          | 5,685,420  | 284,271     | 533,920  | 6,915   | 163,200                        | 1,496   |
| Value of products.....       |            | 55,796   |            | 5,189,832   |          | 6,915   |                                | 18,810  |

| Items.                       | St. Michaels. |          | Claiborne. |         | Oxford and Bellevue. |          | Tilghman Island. |         |
|------------------------------|---------------|----------|------------|---------|----------------------|----------|------------------|---------|
|                              | No.           | Value.   | No.        | Value.  | No.                  | Value.   | No.              | Value.  |
| Establishments .....         | 3             | \$12,700 | 2          | \$2,250 | 12                   | \$24,345 | 2                | \$2,850 |
| Cash capital .....           |               | 7,500    |            | 1,400   |                      | 12,575   |                  | 1,600   |
| Persons engaged .....        | 112           |          | 43         |         | 550                  |          | 37               |         |
| Products handled:            |               |          |            |         |                      |          |                  |         |
| Oysters, opened.gallons..... | 84,675        | 66,876   | 19,666     | 14,724  | 242,953              | 172,110  | 23,590           | 16,693  |
| Crab meat.....pounds.....    |               |          |            |         | 63,756               | 6,301    |                  |         |
| Value of products.....       |               | 66,876   |            | 14,724  |                      | 178,411  |                  | 16,693  |

| Items.                              | Deal Island. |         | Oriole, Chance, and Mount Vernon. |         | Cambridge. |          | White Haven and Nanticoke. |         |
|-------------------------------------|--------------|---------|-----------------------------------|---------|------------|----------|----------------------------|---------|
|                                     | No.          | Value.  | No.                               | Value.  | No.        | Value.   | No.                        | Value.  |
| Establishments .....                | 7            | \$3,835 | 5                                 | \$1,948 | 22         | \$61,515 | 2                          | \$2,835 |
| Cash capital .....                  |              | 3,800   |                                   | 3,000   |            | 67,300   |                            | 2,000   |
| Persons engaged .....               | 100          |         | 19                                |         | 1,030      |          | 112                        |         |
| Products handled:                   |              |         |                                   |         |            |          |                            |         |
| Oysters, opened.gallons.....        | 41,500       | 34,975  |                                   |         | 482,193    | 354,252  | 27,412                     | 19,179  |
| Oysters in shell.bushels.....       |              |         | 9,000                             | 3,600   |            |          |                            |         |
| Shells.....do.....                  |              |         |                                   |         | 769,837    | 9,652    |                            |         |
| Crabs, hard.....number.....         |              |         | 159,000                           | 1,430   | 1,370,045  | 10,435   |                            |         |
| Crabs, soft.....do.....             | 652,800      | 15,505  | 570,000                           | 11,873  | 75,000     | 1,565    |                            |         |
| Crab meat.....pounds.....           |              |         |                                   |         | 9,000      | 900      |                            |         |
| Terrapin, diamond-back, number..... |              |         | 448                               | 292     |            |          |                            |         |
| Value of products.....              |              | 50,480  |                                   | 17,195  |            | 376,804  |                            | 19,179  |

Table showing the extent of the wholesale trade in fishery products of Maryland in 1897—  
Continued.

| Items.                         | Fairmount and vicinity. |          | Westover and Edwin. |        | Coulbourn Creek. |          |
|--------------------------------|-------------------------|----------|---------------------|--------|------------------|----------|
|                                | No.                     | Value.   | No.                 | Value. | No.              | Value.   |
| Establishments .....           | 7                       | \$11,525 | 5                   | \$425  | 4                | \$11,345 |
| Cash capital .....             |                         | 14,700   |                     | 3,500  |                  | 6,500    |
| Persons engaged.....           | 218                     |          | 15                  |        | 156              |          |
| Products handled:              |                         |          |                     |        |                  |          |
| Oysters opened.....gallons..   | 74,400                  | 60,500   |                     |        | 57,500           | 46,000   |
| Oysters in shell.....bushels.. |                         |          | 10,775              | 5,681  |                  |          |
| Crabs, hard.....number..       | 25,000                  | 125      |                     |        | 9,500            | 62       |
| Crabs, soft.....do.....        | 150,528                 | 5,645    |                     |        | 195,000          | 5,600    |
| Value of products.....         |                         | 66,270   |                     | 5,681  |                  | 51,662   |

| Items.                           | Tulls Corner and East Creek. |         | Crisfield. |          | Lawsonia. |         | Total.     |             |
|----------------------------------|------------------------------|---------|------------|----------|-----------|---------|------------|-------------|
|                                  | No.                          | Value.  | No.        | Value.   | No.       | Value.  | No.        | Value.      |
| Establishments .....             | 6                            | \$6,275 | 31         | \$52,125 | 9         | \$5,763 | 235        | \$1,759,391 |
| Cash capital .....               |                              | 6,200   |            | 92,300   |           | 7,550   |            | 1,615,285   |
| Persons engaged.....             | 138                          |         | 985        |          | 162       |         | 15,788     |             |
| Products handled:                |                              |         |            |          |           |         |            |             |
| Oysters—                         |                              |         |            |          |           |         |            |             |
| Canned.....1-lb. cans..          |                              |         |            |          |           |         | 11,399,867 | 710,695     |
| Canned.....2-lb. cans..          |                              |         |            |          |           |         | 6,906,370  | 829,995     |
| Opened.....gallons..             | 53,843                       | 42,752  | 249,519    | 201,961  | 53,666    | 41,878  | 4,365,384  | 3,552,561   |
| In shell.....bushels..           |                              |         | 18,480     | 19,790   | 3,500     | 2,500   | 127,255    | 159,471     |
| Shells.....do.....               |                              |         | 100,000    | 1,350    |           |         | 3,385,005  | 17,943      |
| Lime (made from shells), bushels |                              |         |            |          |           |         | 440,250    | 17,079      |
| Clams.....number..               |                              |         | 2,100,000  | 4,050    | 1,200,000 | 3,194   | 3,716,000  | 8,576       |
| Crabs—                           |                              |         |            |          |           |         |            |             |
| Hard.....do.....                 |                              |         | 192,200    | 1,297    |           |         | 2,955,745  | 18,000      |
| Soft.....do.....                 |                              |         | 5,432,868  | 162,599  | 540,600   | 11,360  | 9,522,613  | 254,849     |
| Crab meat.....pounds..           |                              |         | 12,900     | 1,598    |           |         | 143,472    | 16,107      |
| Shrimp.....do.....               |                              |         |            |          |           |         | 2,625      | 328         |
| Terrapin—                        |                              |         |            |          |           |         |            |             |
| Diamond-back, number             |                              |         | 12,560     | 24,455   |           |         | 16,996     | 39,234      |
| Western.....number..             |                              |         |            |          |           |         | 6,744      | 1,400       |
| Sliders.....do.....              |                              |         |            |          |           |         | 61,550     | 1,210       |
| Snapping turtles..do.....        |                              |         |            |          |           |         | 38,610     | 1,610       |
| Fish—                            |                              |         |            |          |           |         |            |             |
| Fresh.....pounds..               |                              |         | 282,246    | 10,185   |           |         | 18,808,417 | 742,557     |
| Salted.....do.....               |                              |         |            |          |           |         | 6,382,540  | 292,682     |
| Value of products.....           |                              | 42,752  |            | 427,285  |           | 58,932  |            | 6,664,297   |

## FISHERIES OF VIRGINIA.

The fisheries of Virginia are prosecuted mainly in the waters of Chesapeake Bay and the estuaries and rivers tributary thereto, the exception being the oyster and other fisheries along the ocean coast of Accomac, Northampton, and Princess Anne counties.

The persons employed in the fisheries in 1897 numbered 28,277, of whom 5,102 were on vessels, either fishing or transporting, and 19,150 were engaged in the shore fisheries, while the remaining 4,025 persons were employed in menhaden and oyster factories and in the wholesale trade. This is a considerable increase over 1891, when 4,308 persons were employed on vessels, 16,027 in the shore fisheries, and 3,260 in the factories and the wholesale trade, a total of 23,595.

The investment in the fisheries included 1,055 vessels, valued with their outfit at \$914,824; 10,302 boats, worth \$493,276; 1,250 pound nets, worth \$264,600; 145 seines, worth \$54,012; 9,307 gill nets, worth \$46,235; oyster dredges and tongs, worth \$73,755, and various minor apparatus; worth \$12,402. Besides the foregoing there was \$607,682 worth of shore and accessory property employed and cash capital to the amount of \$424,750, making a total investment of \$2,891,536.

This was a slight decrease from the figures for 1891, when the value of the investment was \$2,948,659. The principal decrease was in value of shore and accessory property and cash capital, which in 1891 was reported at \$717,787 and \$467,500, respectively. The vessels with their outfit in 1891 were valued at \$939,136 and the boats at \$463,722. As a partial offset for this decrease a large increase occurred in the value of the pound nets, their value being \$165,990 in 1891 and \$264,600 in 1897, the number in the meantime increasing from 891 to 1,250.

The value of products in 1897 was \$3,179,498, being \$468,347 less than in 1891 when the yield was worth \$3,647,845 to the fishermen. This decrease is due to the reduced value of the oyster product, which in 1891 was worth \$2,524,348, whereas in 1897 it was but \$2,041,683. The yield of shad, the second item in value among the fishery products, shows a gratifying increase from \$207,394 in 1891 to \$304,448 in 1897. During the same years the menhaden product shows an increase from \$197,523 to \$255,241; the value of the clams increased from \$36,030 to \$66,097, and the crab yield arose from \$62,062 to \$68,245. Most of the other species show a decrease in the yield—squeteague from \$124,645 to \$89,967; alewives or river herring from \$93,905 to \$70,841; blue-fish from \$67,545 to \$34,802, and cat-fish from \$28,487 to \$12,292.

The decrease in value of the fisheries is not due to a reduction in quantity of products obtained, but to a smaller selling price. For instance, while the oyster yield decreased in value from \$2,524,348 to \$2,041,683, the quantity obtained in the former year was 6,162,086 bushels and in 1897 it was 7,023,848 bushels. The value of squeteague decreased from \$124,645 in 1891 to \$89,967 in 1897, although the

quantity increased from 3,929,899 pounds in the former year to 6,525,806 pounds in the latter. The yield of croakers increased in weight from 1,075,690 pounds in 1891 to 4,161,529 pounds in 1897, but the value decreased from \$36,847 to \$28,144.

The condensed statistics of the fisheries of this State are shown in the following three tables, relating respectively to the persons employed, the capital invested, and the products:

*Table of persons employed.*

|                                 | How engaged. | No.    |
|---------------------------------|--------------|--------|
| In vessel fisheries .....       |              | 4,282  |
| On vessels transporting .....   |              | 820    |
| In shore or boat fisheries..... |              | 19,150 |
| Shoresmen .....                 |              | 4,025  |
| Total .....                     |              | 28,277 |

*Table of apparatus and capital.*

| Items.                             | No.    | Value.    | Items.                             | No.    | Value.    |
|------------------------------------|--------|-----------|------------------------------------|--------|-----------|
| Vessels fishing.....               | 791    | \$464,487 | Apparatus—shore fisheries—         |        |           |
| Tonnage.....                       | 9,796  |           | Continued.                         |        |           |
| Outfit.....                        |        | 199,675   | Fyke nets.....                     | 361    | \$4,687   |
| Vessels transporting.....          | 264    | 211,375   | Minor nets.....                    | 450    | 205       |
| Tonnage.....                       | 5,422  |           | Lines.....                         |        | 1,632     |
| Outfit.....                        |        | 39,287    | Eel pots.....                      | 270    | 404       |
| Boats.....                         | 10,302 | 493,276   | Slat traps.....                    | 68     | 1,345     |
| Apparatus—vessel fisheries:        |        |           | Spears.....                        | 14     | 17        |
| Seines (total length, 31,668 feet) | 38     | 25,550    | Oyster dredges or scrapes.....     | 458    | 6,110     |
| Oyster dredges.....                | 532    | 14,594    | Oyster tongs.....                  | 10,590 | 46,157    |
| Oyster tongs and forks.....        | 1,791  | 6,894     | Clam tongs, rakes, hoes, and       |        |           |
| Clam tongs, rakes, etc.....        | 159    | 89        | forks.....                         | 1,012  | 1,960     |
| Apparatus—shore fisheries:         |        |           | Crab dredges or scrapes.....       | 826    | 2,063     |
| Seines (total length, 121,377      |        |           | Shore and accessory property ..... |        | 607,682   |
| feet).....                         | 107    | 28,462    | Cash capital.....                  |        | 424,750   |
| Pound nets.....                    | 1,250  | 264,600   |                                    |        |           |
| Gill nets (total length, 1,113,-   |        |           | Total .....                        |        | 2,891,536 |
| 324 feet).....                     | 9,307  | \$46,235  |                                    |        |           |

*Table of products.*

| Species.              | Lbs.        | Value.   | Species.              | Lbs.                    | Value.    |
|-----------------------|-------------|----------|-----------------------|-------------------------|-----------|
| Alewives, fresh.....  | 13,217,510  | \$66,174 | Pike.....             | 34,963                  | \$2,680   |
| Alewives, salted..... | 472,000     | 4,667    | Pompano.....          | 70,135                  | 5,515     |
| Black bass.....       | 14,075      | 654      | Scup.....             | 4,000                   | 120       |
| Blue-fish.....        | 1,505,228   | 34,802   | Sea bass.....         | 1,765                   | 40        |
| Bonito.....           | 25,350      | 798      | Shad.....             | 11,529,474              | 304,448   |
| Butter-fish.....      | 465,828     | 10,624   | Sheepshead.....       | 28,968                  | 1,905     |
| Carp.....             | 5,119       | 167      | Spanish mackerel..... | 503,106                 | 39,911    |
| Cat-fish.....         | 457,417     | 12,292   | Spots.....            | 1,081,292               | 26,539    |
| Cero.....             | 1,200       | 73       | Squeteague.....       | 6,525,806               | 89,967    |
| Cod.....              | 800         | 40       | Striped bass.....     | 576,262                 | 35,079    |
| Crevalle.....         | 123,300     | 2,523    | Sturgeon.....         | 631,619                 | 16,563    |
| Croakers.....         | 4,161,529   | 28,144   | Suckers.....          | 75,606                  | 2,250     |
| Drum.....             | 114,420     | 1,094    | Sun-fish.....         | 2,350                   | 66        |
| Eels.....             | 84,560      | 2,790    | Whiting.....          | 14,100                  | 285       |
| Flounders.....        | 265,280     | 7,930    | Oysters.....          | <sup>1</sup> 49,166,936 | 2,041,683 |
| Hickory shad.....     | 196,916     | 3,409    | Clams.....            | <sup>2</sup> 841,568    | 66,097    |
| Hog-fish.....         | 15,390      | 940      | Crabs, soft.....      | <sup>3</sup> 1,068,116  | 39,914    |
| King-fish.....        | 120,075     | 4,970    | Crabs, hard.....      | <sup>4</sup> 5,331,398  | 28,331    |
| Mackerel.....         | 300         | 18       | Terrapins.....        | 11,822                  | 2,104     |
| Menhaden.....         | 178,656,362 | 255,241  | Turtles.....          | 56,825                  | 1,077     |
| Moon-fish.....        | 28,494      | 727      | Frogs.....            | 1,025                   | 108       |
| Mullet.....           | 54,521      | 1,196    | Caviar.....           | 63,960                  | 19,023    |
| Perch, white.....     | 273,294     | 13,527   |                       |                         |           |
| Perch, yellow.....    | 113,885     | 2,993    | Total.....            | 277,993,949             | 3,179,498 |

<sup>1</sup> 7,023,848 bushels.

<sup>2</sup> 105,196 bushels.

<sup>3</sup> 3,204,348 in number.

<sup>4</sup> 15,994,194 in number.



The crustacean and molluscan products above shown in pounds are given by number and bushels in the following table:

| Products.           | No.        | Value.    |
|---------------------|------------|-----------|
| Crabs, hard.....    | 15,994,194 | \$28,331  |
| Crabs, soft.....    | 3,204,348  | 39,914    |
| Clams.....bushels.. | 105,196    | 66,097    |
| Oysters.....do..... | 7,023,848  | 2,041,683 |

## STATISTICS BY COUNTIES.

There are in Virginia 34 counties bordering on the tidal waters, in all of which the commercial fisheries are more or less extensive. The most important of these, from a fishery point of view, are Accomac, Lancaster, Northumberland, Middlesex, Elizabeth City, Norfolk, Mathews, Northampton, York, and Gloucester. The fisheries in some of the remaining 24 counties are of comparatively small extent. The following series of tables present detailed statistics for each county for 1897:

*Table showing the number of persons employed in the fisheries of Virginia in 1897.*

| Counties.           | In vessel fisheries. | On vessels trans-<br>porting. | In shore or boat fisheries. | Shoresmen. | Total. |
|---------------------|----------------------|-------------------------------|-----------------------------|------------|--------|
| Accomac.....        | 1,023                | 107                           | 2,470                       | 490        | 4,090  |
| Alexandria.....     | 8                    | 10                            | 180                         | .....      | 198    |
| Caroline.....       | .....                | .....                         | 28                          | .....      | 28     |
| Charles City.....   | .....                | .....                         | 201                         | .....      | 201    |
| Chesterfield.....   | .....                | .....                         | 26                          | .....      | 26     |
| Dinwiddie.....      | .....                | .....                         | 18                          | .....      | 18     |
| Elizabeth City..... | 179                  | 35                            | 614                         | 489        | 1,317  |
| Essex.....          | .....                | 19                            | 571                         | .....      | 590    |
| Fairfax.....        | .....                | .....                         | 176                         | 9          | 185    |
| Gloucester.....     | 354                  | 58                            | 837                         | .....      | 1,249  |
| Hanover.....        | .....                | .....                         | 34                          | .....      | 34     |
| Henrico.....        | .....                | .....                         | 177                         | .....      | 177    |
| Isle of Wight.....  | 109                  | 2                             | 230                         | .....      | 341    |
| James City.....     | 11                   | .....                         | 122                         | .....      | 133    |
| King and Queen..... | 7                    | .....                         | 44                          | .....      | 51     |
| King George.....    | 17                   | .....                         | 294                         | .....      | 311    |
| King William.....   | 94                   | 16                            | 200                         | 197        | 507    |
| Lancaster.....      | 237                  | 62                            | 2,188                       | 363        | 2,850  |
| Mathews.....        | 42                   | 126                           | 1,650                       | .....      | 1,818  |
| Middlesex.....      | 12                   | 49                            | 2,682                       | 17         | 2,760  |
| Nansemond.....      | 306                  | 25                            | 378                         | 79         | 788    |
| New Kent.....       | .....                | .....                         | 260                         | .....      | 260    |
| Norfolk.....        | 620                  | 133                           | 1,005                       | 1,805      | 3,563  |
| Northampton.....    | 140                  | 62                            | 592                         | 113        | 907    |
| Northumberland..... | 573                  | 25                            | 1,080                       | 266        | 1,944  |
| Princess Anne.....  | .....                | .....                         | 288                         | 103        | 391    |
| Prince George.....  | .....                | .....                         | 164                         | .....      | 164    |
| Prince William..... | .....                | 2                             | 127                         | 5          | 134    |
| Richmond.....       | 38                   | 32                            | 681                         | .....      | 751    |
| Stafford.....       | .....                | .....                         | 134                         | 13         | 147    |
| Surry.....          | .....                | .....                         | 72                          | .....      | 72     |
| Warwick.....        | 124                  | 17                            | 168                         | .....      | 309    |
| Westmoreland.....   | 160                  | 11                            | 596                         | .....      | 767    |
| York.....           | 228                  | 29                            | 863                         | 76         | 1,196  |
| Total.....          | 4,282                | 820                           | 19,150                      | 4,025      | 28,277 |

Table showing, by counties, the vessels, boats, apparatus, and shore property employed in the fisheries of Virginia in 1897.

| Items.                                   | Accomac. |          | Alexandria. |        | Caroline. |        | Charles City. |         | Chesterfield. |        |
|--|----------|----------|-------------|--------|-----------|--------|---------------|---------|---------------|--------|
|  | No.      | Value.   | No.         | Value. | No.       | Value. | No.           | Value.  | No.           | Value. |
| Vessels fishing .....                    | 181      | \$89,957 | 1           | \$650  |           |        |               |         |               |        |
| Tonnage .....                            | 1,936    |          | 17          |        |           |        |               |         |               |        |
| Outfit .....                             |          | 31,316   |             | 165    |           |        |               |         |               |        |
| Vessels transporting .....               | 31       | 41,750   | 4           | 2,200  |           |        |               |         |               |        |
| Tonnage .....                            | 847      |          | 44          |        |           |        |               |         |               |        |
| Outfit .....                             |          | 5,332    |             | 260    |           |        |               |         |               |        |
| Boats .....                              | 1,844    | 106,248  | 94          | 2,570  | 13        | \$160  | 103           | \$1,728 | 8             | \$150  |
| Apparatus—vessel fisheries:              |          |          |             |        |           |        |               |         |               |        |
| Seines .....                             | 5        | 3,000    | 1           | 150    |           |        |               |         |               |        |
| Oyster dredges .....                     | 296      | 7,084    |             |        |           |        |               |         |               |        |
| Oyster tongs and forks .....             | 304      | 975      |             |        |           |        |               |         |               |        |
| Clam tongs, rakes, etc. ....             | 189      | 71       |             |        |           |        |               |         |               |        |
| Apparatus—shore fisheries:               |          |          |             |        |           |        |               |         |               |        |
| Seines .....                             | 37       | 662      | 1           | 100    | 1         | 300    | 1             | 200     | 5             | 250    |
| Pound nets .....                         | 77       | 16,275   |             |        | 15        | 1,500  |               |         |               |        |
| Gill nets .....                          | 5        | 36       | 87          | 4,955  | 6         | 123    | 137           | 5,062   | 3             | 45     |
| Fyke nets .....                          | 10       | 430      |             |        |           |        |               |         |               |        |
| Minor nets .....                         | 89       | 30       |             |        |           |        | 2             | 5       | 2             | 6      |
| Lines .....                              |          | 165      |             |        |           |        |               | 2       |               |        |
| Eel pots .....                           | 32       | 18       |             |        |           |        |               |         |               |        |
| Spears .....                             | 14       | 17       |             |        |           |        |               |         |               |        |
| Oyster dredges or scrapes ..             | 213      | 3,632    |             |        |           |        |               |         |               |        |
| Oyster tongs .....                       | 1,690    | 8,146    |             |        |           |        |               |         |               |        |
| Clam tongs, rakes, hoes, and forks ..... | 779      | 1,680    |             |        |           |        |               |         |               |        |
| Crab dredges or scrapes .....            | 826      | 2,063    |             |        |           |        |               |         |               |        |
| Shore and accessory property ..          |          | 52,165   |             | 300    |           | 200    |               | 1,100   |               |        |
| Cash capital .....                       |          | 61,750   |             |        |           |        |               |         |               |        |
| Total .....                              |          | 432,802  |             | 11,350 |           | 2,283  |               | 8,097   |               | 451    |

| Items.                          | Dinwiddie. |        | Elizabeth City. |          | Essex. |         | Fairfax. |         | Gloucester. |          |
|---------------------------------|------------|--------|-----------------|----------|--------|---------|----------|---------|-------------|----------|
|                                 | No.        | Value. | No.             | Value.   | No.    | Value.  | No.      | Value.  | No.         | Value.   |
| Vessels fishing .....           |            |        | 26              | \$38,035 |        |         |          |         | 88          | \$44,325 |
| Tonnage .....                   |            |        | 446             |          |        |         |          |         | 1,269       |          |
| Outfit .....                    |            |        |                 | 14,149   |        |         |          |         |             | 20,253   |
| Vessels transporting .....      |            |        | 9               | 9,750    | 6      | \$3,800 |          |         | 22          | 16,250   |
| Tonnage .....                   |            |        | 283             |          | 154    |         |          |         | 400         |          |
| Outfit .....                    |            |        |                 | 1,925    |        | 868     |          |         |             | 2,783    |
| Boats .....                     | 9          | \$90   | 323             | 18,385   | 264    | 6,740   | 67       | \$3,968 | 448         | 27,345   |
| Apparatus—vessel fisheries:     |            |        |                 |          |        |         |          |         |             |          |
| Seines .....                    |            |        | 5               | 3,000    |        |         |          |         |             |          |
| Oyster dredges .....            |            |        | 32              | 1,565    |        |         |          |         |             |          |
| Oyster tongs and forks .....    |            |        | 70              | 243      |        |         |          |         | 277         | 1,055    |
| Clam tongs, rakes, etc. ....    |            |        | 2               | 4        |        |         |          |         |             |          |
| Apparatus—shore fisheries:      |            |        |                 |          |        |         |          |         |             |          |
| Seines .....                    |            |        |                 |          | 3      | 550     | 2        | 8,150   |             |          |
| Pound nets .....                |            |        | 75              | 22,850   | 26     | 2,825   | 40       | 2,445   | 110         | 30,250   |
| Gill nets .....                 | 7          | 105    |                 |          | 639    | 682     | 19       | 900     |             |          |
| Fyke nets .....                 |            |        |                 |          | 18     | 225     | 59       | 733     |             |          |
| Minor nets .....                | 2          | 6      |                 |          |        |         |          |         |             |          |
| Lines .....                     |            |        |                 | 240      |        |         |          |         |             | 36       |
| Eel pots .....                  |            |        |                 |          | 12     | 30      |          |         |             |          |
| Oyster tongs .....              |            |        | 402             | 1,447    | 297    | 891     |          |         | 933         | 3,109    |
| Shore and accessory property .. |            | 75     |                 | 97,790   |        | 725     |          | 4,200   |             | 2,100    |
| Cash capital .....              |            |        |                 | 57,000   |        |         |          |         |             |          |
| Total .....                     |            | 276    |                 | 266,383  |        | 17,336  |          | 20,396  |             | 147,506  |

| Items.                          | Princess Anne. |         | Prince George. |         | Prince William. |        | Richmond. |          | Stafford. |         |
|---------------------------------|----------------|---------|----------------|---------|-----------------|--------|-----------|----------|-----------|---------|
|                                 | No.            | Value.  | No.            | Value.  | No.             | Value. | No.       | Value.   | No.       | Value.  |
| Vessels transporting .....      |                |         |                |         | 1               | \$300  |           |          |           |         |
| Tonnage .....                   |                |         |                |         | 8               |        |           |          |           |         |
| Outfit .....                    |                |         |                |         |                 | 55     |           |          |           |         |
| Boats .....                     | 159            | \$3,390 | 98             | \$1,090 | 47              | 1,735  | 319       | \$10,900 | 33        | \$1,945 |
| Apparatus—shore fisheries:      |                |         |                |         |                 |        |           |          |           |         |
| Seines .....                    | 4              | 2,100   | 1              | 100     | 3               | 3,115  |           |          | 3         | 4,700   |
| Pound nets .....                | 16             | 17,700  |                |         | 12              | 810    | 89        | 12,625   | 42        | 1,910   |
| Gill nets .....                 | 211            | 1,398   | 108            | 4,176   | 20              | 1,250  | 1,784     | 1,784    | 6         | 625     |
| Fyke nets .....                 |                |         |                |         | 24              | 420    |           |          |           |         |
| Minor nets .....                |                |         | 6              | 15      |                 |        |           |          |           |         |
| Lines .....                     |                | 212     |                | 3       |                 |        |           |          |           |         |
| Eel pots .....                  |                |         |                |         |                 |        | 100       | 200      |           |         |
| Oyster tongs .....              | 100            | 150     |                |         |                 |        | 401       | 1,387    |           |         |
| Shore and accessory property .. |                | 8,475   |                | 800     |                 | 1,280  |           | 3,475    |           | 4,225   |
| Cash capital .....              |                | 1,000   |                |         |                 |        |           |          |           |         |
| Total .....                     |                | 34,425  |                | 6,184   |                 | 8,965  |           | 30,371   |           | 13,405  |

*Vessels, boats, apparatus, etc., employed in the fisheries in Virginia in 1897—Continued.*

| Items.                             | Hanover. |        | Henrico. |         | Isle of Wight. |         | James City. |         | King and Queen. |        |
|------------------------------------|----------|--------|----------|---------|----------------|---------|-------------|---------|-----------------|--------|
|                                    | No.      | Value. | No.      | Value.  | No.            | Value.  | No.         | Value.  | No.             | Value. |
| Vessels fishing .....              |          |        |          |         | 27             | \$5,250 | 2           | \$1,200 | 3               | \$350  |
| Tonnage .....                      |          |        |          |         | 249            |         | 79          |         | 23              |        |
| Outfit .....                       |          |        |          |         |                | 3,541   |             | 535     |                 | 180    |
| Vessels transporting .....         |          |        |          |         | 1              | 150     |             |         |                 |        |
| Tonnage .....                      |          |        |          |         | 5              |         |             |         |                 |        |
| Outfit .....                       |          |        |          |         |                | 104     |             |         |                 |        |
| Boats .....                        | 17       | \$136  | 100      | \$1,192 | 120            | 2,511   | 63          | 1,219   | 22              | 154    |
| Apparatus—vessel fisheries:        |          |        |          |         |                |         |             |         |                 |        |
| Oyster tongs and forks .....       |          |        |          |         | 80             | 280     | 10          | 33      | 6               | 21     |
| Apparatus—shore fisheries:         |          |        |          |         |                |         |             |         |                 |        |
| Seines .....                       |          |        | 1        | 250     | 2              | 110     | 3           | 290     |                 |        |
| Gill nets .....                    | 28       | 240    | 117      | 2,136   | 2,057          | 5,355   | 438         | 2,352   | 44              | 484    |
| Fyke nets .....                    |          |        |          |         | 18             | 270     |             |         |                 |        |
| Lines .....                        |          |        |          |         |                | 60      |             |         |                 |        |
| Eel pots .....                     |          |        |          |         | 30             | 30      |             |         |                 |        |
| Slat traps .....                   |          |        | 65       | 1,300   |                |         |             |         |                 |        |
| Oyster tongs .....                 |          |        |          |         |                |         | 34          | 148     |                 |        |
| Shore and accessory property ..... |          |        |          | 600     |                | 5,100   |             | 631     |                 | 250    |
| Total .....                        |          | 376    |          | 5,478   |                | 22,761  |             | 6,413   |                 | 1,439  |

| Items.                             | King George. |        | King William. |         | Lancaster. |          | Mathews. |         | Middlesex. |        |
|------------------------------------|--------------|--------|---------------|---------|------------|----------|----------|---------|------------|--------|
|                                    | No.          | Value. | No.           | Value.  | No.        | Value.   | No.      | Value.  | No.        | Value. |
| Vessels fishing .....              | 4            | \$875  | 15            | \$8,775 | 18         | \$64,850 | 10       | \$3,100 | 2          | \$550  |
| Tonnage .....                      | 21           |        | 235           |         | 635        |          | 110      |         | 27         |        |
| Outfit .....                       |              | 600    |               | 5,225   |            | 16,333   |          | 2,070   |            | 475    |
| Vessels transporting .....         |              |        | 6             | 5,250   | 16         | 12,100   | 43       | 32,350  | 14         | 10,550 |
| Tonnage .....                      |              |        | 107           |         | 355        |          | 954      |         | 451        |        |
| Outfit .....                       |              |        |               | 738     |            | 2,790    |          | 6,790   |            | 2,557  |
| Boats .....                        | 143          | 5,361  | 99            | 838     | 1,096      | 65,660   | 828      | 40,745  | 964        | 55,700 |
| Apparatus—vessel fisheries:        |              |        |               |         |            |          |          |         |            |        |
| Seines .....                       |              |        |               |         | 9          | 6,900    |          |         |            |        |
| Oyster dredges .....               | 8            | 105    |               |         | 6          | 300      |          |         |            |        |
| Oyster tongs and forks .....       |              |        | 78            | 311     | 18         | 137      | 24       | 174     | 8          | 28     |
| Apparatus—shore fisheries:         |              |        |               |         |            |          |          |         |            |        |
| Seines .....                       | 3            | 750    | 3             | 700     | 7          | 1,650    |          |         |            |        |
| Pound nets .....                   | 112          | 9,560  |               |         | 136        | 26,900   | 106      | 24,425  | 8          | 1,200  |
| Gill nets .....                    | 219          | 2,210  | 351           | 3,055   |            |          | 10       | 100     |            |        |
| Fyke nets .....                    | 9            | 135    | 181           | 1,810   |            |          |          |         |            |        |
| Minor nets .....                   |              |        |               |         | 114        | 30       |          |         |            |        |
| Lines .....                        |              | 10     |               | 45      |            |          |          | 150     |            |        |
| Oyster dredges or scrapes .....    | 12           | 72     |               |         |            |          |          |         |            |        |
| Oyster tongs .....                 | 60           | 240    | 4             | 16      | 1,186      | 6,180    | 1,076    | 5,398   | 1,322      | 7,488  |
| Clam tongs, rakes, etc. ....       |              |        |               |         |            |          | 100      | 150     |            |        |
| Shore and accessory property ..... |              | 1,445  |               | 17,050  |            | 85,050   |          | 2,765   |            | 4,325  |
| Cash capital .....                 |              |        |               | 29,000  |            | 37,000   |          |         |            |        |
| Total .....                        |              | 21,363 |               | 72,813  |            | 325,880  |          | 118,217 |            | 82,873 |

| Items.                             | Nansemond. |          | New Kent. |        | Norfolk. |          | Northampton. |          | Northumberland. |          |
|------------------------------------|------------|----------|-----------|--------|----------|----------|--------------|----------|-----------------|----------|
|                                    | No.        | Value.   | No.       | Value. | No.      | Value.   | No.          | Value.   | No.             | Value.   |
| Vessels fishing .....              | 63         | \$23,875 |           |        | 126      | \$45,890 | 32           | \$22,175 | 71              | \$71,880 |
| Tonnage .....                      | 657        |          |           |        | 1,278    |          | 370          |          | 1,171           |          |
| Outfit .....                       |            | 18,129   |           |        |          | 34,656   |              | 8,786    |                 | 22,953   |
| Vessels transporting .....         | 10         | 5,650    |           |        | 47       | 34,525   | 27           | 16,100   | 7               | 7,350    |
| Tonnage .....                      | 109        |          |           |        | 776      |          | 331          |          | 246             |          |
| Outfit .....                       |            | 1,300    |           |        |          | 7,085    |              | 3,012    |                 | 950      |
| Boats .....                        | 204        | 2,629    | 144       | \$754  | 456      | 31,155   | 537          | 13,937   | 831             | 37,025   |
| Apparatus—vessel fisheries:        |            |          |           |        |          |          |              |          |                 |          |
| Seines .....                       |            |          |           |        |          |          | 4            | 3,200    | 14              | 9,300    |
| Oyster dredges .....               |            |          |           |        | 2        | 100      | 4            | 100      | 130             | 4,050    |
| Oyster tongs and forks .....       | 208        | 832      |           |        | 423      | 1,741    | 22           | 106      |                 |          |
| Clam tongs, rakes, etc. ....       |            |          |           |        |          |          | 18           | 14       |                 |          |
| Apparatus—shore fisheries:         |            |          |           |        |          |          |              |          |                 |          |
| Seines .....                       | 2          | 575      | 4         | 300    | 4        | 2,000    | 4            | 550      |                 |          |
| Pound nets .....                   | 7          | 3,155    |           |        | 4        | 3,800    | 21           | 14,500   | 259             | 56,200   |
| Gill nets .....                    | 410        | 1,080    | 1,082     | 3,528  | 515      | 1,030    |              |          |                 |          |
| Fyke nets .....                    | 9          | 180      |           |        |          |          | 1            | 100      |                 |          |
| Minor nets .....                   | 20         | 60       |           |        |          |          | 55           | 12       | 160             | 41       |
| Lines .....                        |            | 15       |           |        |          | 42       |              | 262      |                 | 70       |
| Eel pots .....                     |            |          |           |        |          |          |              |          | 60              | 90       |
| Slat traps .....                   | 3          | 45       |           |        |          |          |              |          |                 |          |
| Oyster dredges or scrapes .....    |            |          |           |        |          |          |              |          | 166             | 1,937    |
| Oyster tongs .....                 | 177        | 708      |           |        | 544      | 2,192    | 305          | 1,730    | 686             | 2,222    |
| Clam tongs, rakes, etc. ....       |            |          |           |        |          |          | 133          | 130      |                 |          |
| Shore and accessory property ..... |            | 5,650    |           | 1,030  |          | 228,000  |              | 21,665   |                 | 49,925   |
| Cash capital .....                 |            | 4,000    |           |        |          | 159,000  |              | 13,500   |                 | 62,000   |
| Total .....                        |            | 67,883   |           | 5,612  |          | 551,216  |              | 119,879  |                 | 325,993  |

*Vessels, boats, apparatus, etc., employed in the fisheries of Virginia in 1897—Continued.*

| Items.                             | Surry. |         | Warwick. |         | Westmoreland. |         | York. |          |
|------------------------------------|--------|---------|----------|---------|---------------|---------|-------|----------|
|                                    | No.    | Value.  | No.      | Value.  | No.           | Value.  | No.   | Value.   |
| Vessels fishing .....              |        |         | 25       | \$5,250 | 27            | \$9,875 | 70    | \$27,625 |
| Tonnage .....                      |        |         | 301      |         | 288           |         | 684   |          |
| Outfit .....                       |        |         |          | 2,121   |               | 4,600   |       | 13,588   |
| Vessels transporting .....         |        |         | 6        | 2,750   | 3             | 700     | 11    | 9,850    |
| Tonnage .....                      |        |         | 64       |         | 28            |         | 260   |          |
| Outfit .....                       |        |         |          | 467     |               | 325     |       | 1,946    |
| Boats .....                        | 39     | \$1,205 | 71       | 3,200   | 308           | 15,371  | 431   | 28,040   |
| Apparatus—vessel fisheries:        |        |         |          |         |               |         |       |          |
| Oyster dredges .....               |        |         |          |         | 54            | 1,290   |       |          |
| Oyster tongs and forks .....       |        |         | 88       | 300     |               |         | 175   | 653      |
| Apparatus—shore fisheries:         |        |         |          |         |               |         |       |          |
| Seines .....                       | 1      | 100     | 6        | 330     | 6             | 600     |       |          |
| Pound nets .....                   |        |         | 1        | 200     | 76            | 8,870   | 18    | 6,600    |
| Gill nets .....                    | 874    | 2,971   | 100      | 200     | 23            | 123     | 7     | 230      |
| Fyke nets .....                    |        |         |          |         |               |         | 32    | 384      |
| Lines .....                        |        | 12      |          | 20      |               | 24      |       | 264      |
| Eel pots .....                     | 36     | 36      |          |         |               |         |       |          |
| Oyster dredges or scrapes .....    |        |         |          |         | 67            | 469     |       |          |
| Oyster tongs .....                 |        |         | 95       | 370     | 3,24          | 1,306   | 954   | 3,029    |
| Shore and accessory property ..... |        | 700     |          | 550     |               | 1,530   |       | 4,506    |
| Cash capital .....                 |        |         |          |         |               |         |       | 500      |
| Total .....                        |        | 5,024   |          | 15,788  |               | 45,083  |       | 97,215   |

*Table showing, by counties, the products of the fisheries of Virginia in 1897.*

| Species.               | Accomac.   |         | Alexandria. |        | Caroline. |         | Charles City. |        | Chesterfield. |        |
|------------------------|------------|---------|-------------|--------|-----------|---------|---------------|--------|---------------|--------|
|                        | Lbs.       | Value.  | Lbs.        | Value. | Lbs.      | Value.  | Lbs.          | Value. | Lbs.          | Value. |
| Alewives, fresh ....   | 173,450    | \$625   | 70,000      | \$350  | 171,000   | \$2,040 | 22,400        | \$168  | 22,600        | \$338  |
| Black bass .....       |            |         | 200         | 10     |           |         | 3,400         | 144    |               |        |
| Blue-fish .....        | 123,614    | 3,791   |             |        |           |         |               |        |               |        |
| Bonito .....           | 6,150      | 184     |             |        |           |         |               |        |               |        |
| Butter-fish .....      | 9,000      | 220     |             |        |           |         |               |        |               |        |
| Carp .....             |            |         | 500         | 15     |           |         |               |        |               |        |
| Cat-fish .....         | 3,830      | 216     | 2,800       | 86     | 6,000     | 180     |               |        |               |        |
| Cero .....             | 1,100      | 70      |             |        |           |         |               |        |               |        |
| Cod .....              | 800        | 40      |             |        |           |         |               |        |               |        |
| Croakers .....         | 321,775    | 4,613   |             |        |           |         | 800           | 24     |               |        |
| Drum .....             | 35,140     | 449     |             |        |           |         |               |        |               |        |
| Eels .....             | 7,165      | 217     |             |        |           |         |               |        |               |        |
| Flounders .....        | 23,075     | 378     |             |        |           |         |               |        |               |        |
| Hickory shad .....     |            |         |             |        | 18,000    | 90      | 18,750        | 375    |               |        |
| King-fish .....        | 11,925     | 398     |             |        |           |         |               |        |               |        |
| Mackerel .....         | 100        | 12      |             |        |           |         |               |        |               |        |
| Menhaden .....         | 19,378,100 | 24,952  |             |        |           |         |               |        |               |        |
| Mullet .....           | 14,876     | 304     |             |        |           |         |               |        |               |        |
| Perch, white .....     | 15,760     | 552     | 2,933       | 176    | 2,500     | 75      | 1,500         | 65     |               |        |
| Perch, yellow .....    |            |         | 1,160       | 35     |           |         | 2,800         | 84     |               |        |
| Pompano .....          | 11,835     | 858     |             |        |           |         |               |        |               |        |
| Sea bass .....         | 1,165      | 22      |             |        |           |         |               |        |               |        |
| Shad .....             | 265,850    | 6,935   | 389,700     | 7,794  | 76,875    | 1,780   | 400,750       | 11,550 | 25,317        | 723    |
| Sheepshead .....       | 4,618      | 376     |             |        |           |         |               |        |               |        |
| Spanish mackerel ..... | 102,080    | 7,021   |             |        |           |         |               |        |               |        |
| Spots .....            | 35,116     | 382     |             |        |           |         |               |        |               |        |
| Squeteague .....       | 603,695    | 15,370  | 650         | 26     |           |         | 700           | 21     |               |        |
| Striped bass .....     | 6,800      | 514     | 3,700       | 222    | 9,000     | 450     | 6,000         | 440    |               |        |
| Sturgeon .....         | 22,025     | 1,311   | 1,250       | 75     |           |         | 63,625        | 1,188  |               |        |
| Whiting .....          | 1,500      | 45      |             |        |           |         |               |        |               |        |
| Oysters .....          | 7,077,175  | 383,483 |             |        |           |         |               |        |               |        |
| Clams .....            | 472,576    | 35,196  |             |        |           |         |               |        |               |        |
| Crabs, soft .....      | 888,583    | 31,362  |             |        |           |         |               |        |               |        |
| Crabs, hard .....      | 25,000     | 125     |             |        |           |         |               |        |               |        |
| Terrapin .....         | 2,572      | 1,434   |             |        |           |         | 150           | 30     | 1,500         | 90     |
| Turtles .....          | 700        | 33      |             |        |           |         | 790           | 16     |               |        |
| Frogs .....            |            |         |             |        |           |         | 290           | 23     |               |        |
| Caviar .....           | 100        | 40      |             |        |           |         | 5,320         | 1,596  |               |        |
| Total .....            | 29,647,250 | 521,528 | 472,893     | 8,789  | 283,375   | 4,615   | 527,275       | 15,724 | 49,417        | 1,151  |

## 294 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the products of the fisheries of Virginia in 1897—Continued.

| Species.         | Dinwiddie. |       | Elizabeth City. |         | Essex.    |         | Fairfax.  |         | Gloucester. |         |
|------------------|------------|-------|-----------------|---------|-----------|---------|-----------|---------|-------------|---------|
|                  | Lbs.       | Val.  | Lbs.            | Val.    | Lbs.      | Val.    | Lbs.      | Val.    | Lbs.        | Val.    |
| Alewives, fresh  |            |       | 264,482         | \$2,857 | 142,922   | \$1,559 | 940,742   | \$4,953 | 119,000     | \$1,190 |
| Black bass       |            |       |                 |         |           |         | 875       | 44      |             |         |
| Blue-fish        |            |       | 234,115         | 7,023   |           |         |           |         | 25,200      | 756     |
| Bonito           |            |       | 6,000           | 240     |           |         |           |         |             |         |
| Butter-fish      |            |       | 52,628          | 1,576   |           |         |           |         |             |         |
| Carp             |            |       |                 |         |           |         | 2,282     | 65      |             |         |
| Cat-fish         |            |       |                 |         | 43,800    | 1,314   | 41,810    | 1,255   |             |         |
| Croakers         |            |       | 1,384,164       | 6,921   |           |         |           |         | 330,000     | 1,650   |
| Drum             |            |       | 4,400           | 44      |           |         |           |         | 27,500      | 275     |
| Eels             |            |       |                 |         | 7,000     | 280     | 3,385     | 102     |             |         |
| Flounders        |            |       | 51,485          | 1,554   | 540       | 22      |           |         |             |         |
| Hickory shad     |            |       | 2,740           | 55      |           |         |           |         |             |         |
| King-fish        |            |       | 1,600           | 64      |           |         |           |         |             |         |
| Menhaden         |            |       | 12,005,500      | 28,369  | 52,000    | 35      |           |         | 220,000     | 550     |
| Perch, white     |            |       | 3,400           | 170     | 7,800     | 480     | 37,314    | 2,162   |             |         |
| Perch, yellow    |            |       |                 |         | 1,100     | 33      | 21,800    | 545     |             |         |
| Pike             |            |       |                 |         |           |         | 3,388     | 214     |             |         |
| Pompano          |            |       | 16,055          | 1,151   |           |         |           |         |             |         |
| Shad             | 19,600     | \$560 | 340,816         | 10,227  | 165,328   | 4,462   | 350,803   | 6,877   | 550,000     | 16,500  |
| Sheepshead       |            |       | 2,000           | 160     |           |         |           |         |             |         |
| Spanish mackerel |            |       | 39,525          | 2,193   |           |         |           |         | 11,000      | 660     |
| Spots            |            |       | 149,149         | 2,983   |           |         |           |         |             |         |
| Squeteague       |            |       | 1,446,874       | 21,703  |           |         |           |         | 165,000     | 2,475   |
| Striped bass     |            |       | 3,000           | 120     | 13,500    | 1,230   | 36,497    | 2,168   |             |         |
| Sturgeon         |            |       | 24,757          | 496     | 600       | 12      | 100       | 4       | 24,750      | 495     |
| Suckers          |            |       |                 |         | 775       | 16      | 13,350    | 282     |             |         |
| Sun-fish         |            |       |                 |         |           |         | 1,050     | 32      |             |         |
| Whiting          |            |       | 5,000           | 100     |           |         |           |         |             |         |
| Oysters          |            |       | 3,293,500       | 118,494 | 580,650   | 40,775  |           |         | 3,234,875   | 92,801  |
| Clams            |            |       | 32,400          | 2,450   |           |         |           |         | 57,040      | 4,414   |
| Crabs, hard      |            |       | 727,032         | 2,423   |           |         |           |         | 88,000      | 660     |
| Terrapins        | 500        | 30    |                 |         |           |         |           |         | 1,100       | 400     |
| Turtles          |            |       | 5,750           | 115     |           |         |           |         | 9,000       | 180     |
| Caviar           |            |       | 3,570           | 1,071   | 140       | 40      |           |         | 3,500       | 1,050   |
| Total            | 20,100     | 590   | 20,099,942      | 212,559 | 1,016,155 | 50,258  | 1,453,396 | 18,703  | 4,865,965   | 124,056 |

| Species.         | Princess Anne. |        | Prince George. |        | Prince William. |         | Richmond. |         | Stafford. |         |
|------------------|----------------|--------|----------------|--------|-----------------|---------|-----------|---------|-----------|---------|
|                  | Lbs.           | Value. | Lbs.           | Value. | Lbs.            | Value.  | Lbs.      | Value.  | Lbs.      | Value.  |
| Alewives, fresh  | 16,000         | \$160  |                |        | 568,000         | \$2,970 | 257,500   | \$3,050 | 728,280   | \$4,465 |
| Alewives, salted |                |        |                |        |                 |         |           |         | 406,000   | 4,060   |
| Black bass       |                |        | 3,000          | \$60   |                 |         |           |         |           |         |
| Blue-fish        | 234,269        | 3,686  |                |        |                 |         |           |         |           |         |
| Bonito           | 6,500          | 195    |                |        |                 |         |           |         |           |         |
| Butter-fish      | 240,150        | 5,313  |                |        |                 |         |           |         |           |         |
| Carp             |                |        |                |        | 725             | 22      |           |         | 812       | 49      |
| Cat-fish         |                |        | 5,000          | 100    | 15,200          | 465     | 49,000    | 1,290   | 19,787    | 601     |
| Crevalle         | 117,000        | 2,370  |                |        |                 |         |           |         |           |         |
| Croakers         | 1,012,435      | 5,284  |                |        |                 |         |           |         |           |         |
| Drum             | 14,680         | 150    |                |        |                 |         |           |         |           |         |
| Eels             |                |        |                |        | 2,200           | 66      | 20,000    | 800     | 2,175     | 93      |
| Flounders        | 1,000          | 16     |                |        |                 |         |           |         |           |         |
| Hog-fish         | 10,340         | 675    |                |        |                 |         |           |         |           |         |
| King-fish        | 77,500         | 3,100  |                |        |                 |         |           |         |           |         |
| Menhaden         | 100,000        | 100    |                |        |                 |         | 235,000   | 193     |           |         |
| Moon-fish        | 11,646         | 319    |                |        |                 |         |           |         |           |         |
| Mullet           | 23,245         | 318    |                |        |                 |         | 600       | 12      |           |         |
| Perch, white     | 2,000          | 60     | 800            | 16     | 22,675          | 1,219   | 12,000    | 600     | 19,850    | 1,184   |
| Perch, yellow    |                |        | 600            | 12     | 10,900          | 288     | 2,000     | 60      | 60,325    | 1,509   |
| Pike             |                |        |                |        | 2,200           | 132     |           |         | 28,875    | 2,310   |
| Pompano          | 27,000         | 2,160  |                |        |                 |         |           |         |           |         |
| Scup             | 4,000          | 120    |                |        |                 |         |           |         |           |         |
| Shad             | 92,937         | 3,717  | 298,060        | 9,014  | 208,546         | 3,927   | 320,175   | 8,940   | 72,674    | 1,422   |
| Sheepshead       | 21,500         | 1,290  |                |        |                 |         |           |         |           |         |
| Spanish mackerel | 239,300        | 19,054 |                |        |                 |         |           |         |           |         |
| Spots            | 541,500        | 13,538 |                |        |                 |         |           |         |           |         |
| Squeteague       | 2,402,487      | 24,094 |                |        |                 |         | 7,000     | 210     |           |         |
| Striped bass     | 37,950         | 1,227  |                |        | 36,265          | 1,798   | 39,000    | 3,355   | 45,019    | 2,023   |
| Sturgeon         | 68,400         | 2,776  | 65,850         | 1,288  |                 |         |           |         |           |         |
| Suckers          |                |        |                |        | 6,400           | 128     |           |         |           |         |
| Sun-fish         |                |        | 500            | 10     | 600             | 18      |           |         |           |         |
| Whiting          | 7,600          | 140    |                |        |                 |         |           |         |           |         |
| Oysters          | 8,750          | 938    |                |        |                 |         | 1,054,200 | 66,055  |           |         |
| Crabs, hard      | 705,000        | 4,500  |                |        |                 |         |           |         |           |         |
| Terrapins        |                |        | 6,000          | 120    |                 |         |           |         |           |         |
| Turtles          |                |        | 1,200          | 24     |                 |         |           |         |           |         |
| Caviar           | 8,620          | 2,572  | 5,810          | 1,743  |                 |         |           |         |           |         |
| Total            | 6,031,809      | 97,872 | 386,820        | 12,337 | 873,711         | 11,033  | 1,996,475 | 84,565  | 1,383,797 | 17,711  |

Table showing the products of the fisheries of Virginia in 1897—Continued.

| Species.         | King George. |         | King William. |        | Lancaster. |         | Mathews.  |         | Middlesex. |         |
|------------------|--------------|---------|---------------|--------|------------|---------|-----------|---------|------------|---------|
|                  | Lbs.         | Value.  | Lbs.          | Value. | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.       | Value.  |
| Alewives, fresh  | 1,322,400    | \$8,188 | 28,625        | \$450  | 225,500    | \$1,390 | 413,400   | \$2,067 | 32,000     | \$320   |
| Alewives, salted | 6,000        | 60      |               |        |            |         |           |         |            |         |
| Blue-fish        |              |         |               |        | 14,100     | 583     | 13,500    | 675     |            |         |
| Butter-fish      |              |         |               |        | 60,000     | 900     |           |         |            |         |
| Cat-fish         | 97,715       | 2,517   | 96,050        | 1,921  |            |         |           |         |            |         |
| Croakers         | 6,400        | 202     |               |        | 60,000     | 300     | 20,000    | 200     |            |         |
| Eels             | 1,250        | 43      | 1,810         | 54     |            |         |           |         |            |         |
| Flounders        | 650          | 20      | 9,050         | 452    | 50,000     | 500     | 13,000    | 260     |            |         |
| Hickory shad     |              |         |               |        |            |         | 38,180    | 763     |            |         |
| Menhaden         |              |         |               |        | 61,581,200 | 88,113  | 390,000   | 585     | 16,000     | 40      |
| Mullet           |              |         |               |        |            |         | 4,000     | 80      |            |         |
| Perch, white     | 52,909       | 2,697   | 17,150        | 862    |            |         | 400       | 20      |            |         |
| Perch, yellow    | 4,350        | 141     | 1,400         | 42     |            |         |           |         |            |         |
| Pike             | 300          | 18      |               |        |            |         |           |         |            |         |
| Pompano          |              |         |               |        | 600        | 72      |           |         |            |         |
| Shad             | 401,366      | 8,551   | 145,211       | 2,879  | 858,110    | 26,532  | 1,297,000 | 32,425  | 21,700     | 620     |
| Spanish mackerel |              |         |               |        | 10,400     | 1,031   |           |         |            |         |
| Spots            |              |         |               |        | 2,000      | 60      | 2,000     | 80      |            |         |
| Squeteague       | 825          | 33      | 11,160        | 223    | 130,200    | 3,156   | 70,380    | 704     |            |         |
| Striped bass     | 107,104      | 5,852   | 21,900        | 2,188  | 3,000      | 180     |           |         |            |         |
| Sturgeon         | 19,759       | 1,085   | 6,225         | 125    | 31,000     | 620     | 55,600    | 1,240   |            |         |
| Suckers          |              |         | 17,881        | 358    |            |         |           |         |            |         |
| Oysters          | 167,650      | 8,383   | 477,750       | 11,150 | 4,419,800  | 209,410 | 3,864,000 | 137,250 | 6,157,340  | 297,198 |
| Clams            |              |         |               |        |            |         | 47,600    | 3,400   |            |         |
| Crabs, soft      |              |         |               |        | 118,800    | 6,192   |           |         |            |         |
| Crabs, hard      | 23,833       | 286     | 78,500        | 393    | 12,000     | 88      | 435,000   | 2,900   |            |         |
| Turtles          |              |         |               |        |            |         | 25,000    | 500     |            |         |
| Caviar           | 1,240        | 460     | 1,660         | 498    | 4,340      | 1,302   | 3,640     | 1,040   |            |         |
| Total            | 2,213,751    | 38,536  | 914,372       | 21,595 | 67,581,050 | 340,429 | 6,692,700 | 184,189 | 6,227,040  | 298,178 |

| Species.         | Nansemond. |        | New Kent. |         | Norfolk.  |         | Northampton. |         | Northumberland. |          |
|------------------|------------|--------|-----------|---------|-----------|---------|--------------|---------|-----------------|----------|
|                  | Lbs.       | Value. | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.         | Value.  | Lbs.            | Value.   |
| Alewives, fresh  | 5,100      | \$51   | 146,645   | \$1,051 | 45,000    | \$475   | 773,450      | \$1,583 | 5,128,914       | \$17,774 |
| Alewives, salted |            |        |           |         |           |         |              |         | 38,000          | 332      |
| Black bass       |            |        | 6,600     | 396     |           |         |              |         |                 |          |
| Blue-fish        | 5,000      | 151    |           |         | 1,300     | 65      | 830,090      | 17,328  | 6,485           | 211      |
| Bonito           |            |        |           |         |           |         | 6,700        | 179     |                 |          |
| Butter-fish      | 65,000     | 1,300  |           |         | 24,000    | 960     | 12,100       | 268     | 2,750           | 83       |
| Cat-fish         | 200        | 6      | 1,000     | 20      |           |         |              |         | 875             | 27       |
| Cero             |            |        |           |         |           |         | 100          | 3       |                 |          |
| Crevalle         |            |        |           |         |           |         | 6,300        | 153     |                 |          |
| Croakers         | 130,500    | 1,020  |           |         | 283,000   | 1,790   | 140,725      | 2,072   | 10,700          | 180      |
| Drum             |            |        |           |         | 1,000     | 10      | 31,700       | 166     |                 |          |
| Eels             |            |        |           |         |           |         |              |         | 6,900           | 207      |
| Flounders        | 2,500      | 75     |           |         | 2,000     | 20      | 4,050        | 137     | 73,610          | 3,238    |
| Hickory shad     |            |        | 14,500    | 185     |           |         |              |         | 83,746          | 1,611    |
| Hog-fish         |            |        |           |         | 3,750     | 225     | 300          | 20      | 1,000           | 20       |
| King-fish        |            |        |           |         | 25,000    | 1,000   | 4,050        | 408     |                 |          |
| Mackerel         |            |        |           |         |           |         | 200          | 6       |                 |          |
| Menhaden         | 500,000    | 1,250  |           |         |           |         | 14,724,232   | 20,149  | 69,444,330      | 90,880   |
| Moon-fish        |            |        |           |         |           |         | 16,848       | 408     |                 |          |
| Mullet           |            |        |           |         | 11,800    | 482     |              |         |                 |          |
| Perch, white     | 2,050      | 83     | 2,000     | 100     | 1,200     | 26      |              |         | 1,225           | 38       |
| Perch, yellow    |            |        | 4,700     | 151     |           |         |              |         |                 |          |
| Pompano          |            |        |           |         | 4,000     | 280     | 7,620        | 843     | 3,025           | 151      |
| Sea bass         |            |        |           |         |           |         |              |         | 600             | 18       |
| Shad             | 111,900    | 3,886  | 333,526   | 8,840   | 129,500   | 4,796   | 14,400       | 371     | 3,700,429       | 92,408   |
| Sheepshead       |            |        |           |         |           |         | 850          | 79      |                 |          |
| Spanish mackerel |            |        |           |         | 1,700     | 85      | 95,125       | 9,513   | 3,576           | 322      |
| Spots            | 3,752      | 188    |           |         | 248,500   | 7,330   | 63,300       | 930     | 5,150           | 159      |
| Squeteague       | 209,050    | 2,297  |           |         | 179,000   | 2,790   | 934,583      | 10,146  | 26,150          | 703      |
| Striped bass     | 3,150      | 252    | 6,000     | 420     | 18,000    | 540     | 3,600        | 348     | 65,917          | 5,779    |
| Sturgeon         | 1,000      | 20     | 20,000    | 400     | 2,400     | 120     | 2,880        | 89      | 117,273         | 3,172    |
| Oysters          | 2,970,030  | 68,973 |           |         | 5,033,245 | 186,882 | 1,415,666    | 88,984  | 2,046,205       | 112,691  |
| Clams            |            |        |           |         | 8,000     | 300     | 94,960       | 8,790   |                 |          |
| Crabs, soft      |            |        |           |         |           |         | 4,333        | 390     | 56,400          | 1,970    |
| Crabs, hard      | 8,000      | 200    |           |         | 400,000   | 2,500   | 1,750,000    | 8,100   | 132,000         | 990      |
| Turtles          |            |        | 510       | 10      |           |         |              |         | 13,875          | 199      |
| Frogs            |            |        | 435       | 35      |           |         |              |         | 300             | 50       |
| Caviar           |            |        | 3,750     | 1,125   | 200       | 50      |              |         | 7,000           | 2,000    |
| Total            | 4,017,232  | 79,752 | 539,666   | 12,733  | 6,422,595 | 210,726 | 20,938,162   | 171,463 | 80,976,435      | 335,213  |



Table showing the products of the fisheries of Virginia in 1897—Continued.

| Species.        | Hanover. |        | Henrico. |         | Isle of Wight. |        | James City. |        | King and Queen. |        |
|-----------------|----------|--------|----------|---------|----------------|--------|-------------|--------|-----------------|--------|
|                 | Lbs.     | Value. | Lbs.     | Value.  | Lbs.           | Value. | Lbs.        | Value. | Lbs.            | Value. |
| Alewives, fresh | 10,900   | \$216  | 232,200  | \$1,720 |                |        | 42,000      | \$309  |                 |        |
| Cat-fish        |          |        | 24,000   | 1,047   | 8,000          | \$400  | 1,500       | 45     |                 |        |
| Croakers        |          |        |          |         | 30,500         | 420    |             |        |                 |        |
| Eels            |          |        | 22,500   | 625     | 6,000          | 180    |             |        |                 |        |
| Hickory shad    |          |        | 15,000   | 150     | 6,000          | 180    |             |        |                 |        |
| Perch, white    |          |        | 17,500   | 1,040   | 17,800         | 697    | 11,200      | 436    |                 |        |
| Perch, yellow   |          |        | 500      | 25      |                |        |             |        |                 |        |
| Shad            | 20,387   | 466    | 152,875  | 4,625   | 241,026        | 9,070  | 82,742      | 2,364  | 38,133          | \$686  |
| Squeteague      |          |        |          |         | 75,000         | 1,340  |             |        |                 |        |
| Striped bass    |          |        | 7,000    | 490     | 27,500         | 1,865  | 9,100       | 637    |                 |        |
| Sturgeon        |          |        | 5,000    | 100     | 23,100         | 462    | 29,725      | 577    |                 |        |
| Suckers         |          |        | 36,000   | 1,440   | 1,000          | 20     |             |        |                 |        |
| Oysters         |          |        |          |         | 1,094,800      | 23,775 | 219,100     | 5,275  | 12,250          | 275    |
| Caviar          |          |        | 1,040    | 312     | 3,640          | 1,092  | 5,600       | 1,600  |                 |        |
| Total           | 31,287   | 682    | 513,615  | 11,569  | 1,534,366      | 39,501 | 400,967     | 11,243 | 50,383          | 961    |

| Species.         | Surry.  |       | Warwick.  |        | Westmoreland. |         | York.     |         |
|------------------|---------|-------|-----------|--------|---------------|---------|-----------|---------|
|                  | Lbs.    | Val.  | Lbs.      | Value. | Lbs.          | Value.  | Lbs.      | Value.  |
| Alewives, fresh  |         |       |           |        | 1,282,000     | \$5,675 | 33,000    | \$180   |
| Alewives, salted |         |       |           |        | 22,000        | 215     |           |         |
| Blue-fish        |         |       | 2,000     | \$40   | 3,455         | 130     | 12,100    | 363     |
| Butter-fish      |         |       |           |        | 200           | 4       |           |         |
| Carp             |         |       |           |        | 800           | 16      |           |         |
| Cat-fish         | 1,500   | \$45  |           |        | 39,350        | 762     |           |         |
| Croakers         | 5,000   | 150   | 19,500    | 160    | 2,330         | 69      | 403,700   | 3,089   |
| Eels             | 4,000   | 120   |           |        | 175           | 3       |           |         |
| Flounders        |         |       | 4,500     | 100    | 2,820         | 78      | 27,000    | 1,080   |
| Menhaden         |         |       |           |        |               |         | 10,000    | 25      |
| Perch, white     | 5,100   | 123   |           |        | 16,028        | 638     | 200       | 8       |
| Perch, yellow    |         |       |           |        | 2,250         | 68      |           |         |
| Pike             |         |       |           |        | 200           | 6       |           |         |
| Shad             | 114,480 | 4,243 | 17,500    | 700    | 190,608       | 3,902   | 81,150    | 2,655   |
| Spanish mackerel |         |       |           |        |               |         | 400       | 32      |
| Spots            | 300     | 9     | 11,000    | 315    | 425           | 11      | 19,100    | 554     |
| Squeteague       | 6,000   | 180   | 21,000    | 220    | 8,552         | 334     | 227,500   | 3,942   |
| Striped bass     | 7,642   | 351   | 1,000     | 50     | 56,118        | 2,405   | 2,500     | 175     |
| Sturgeon         | 43,150  | 864   |           |        |               |         | 3,150     | 94      |
| Suckers          |         |       |           |        | 200           | 6       |           |         |
| Sun-fish         |         |       |           |        | 200           | 6       |           |         |
| Oysters          |         |       | 1,087,100 | 17,615 | 990,500       | 56,900  | 3,962,350 | 114,376 |
| Clams            |         |       |           |        |               |         | 128,992   | 11,547  |
| Crabs, hard      |         |       |           |        | 48,533        | 306     | 898,500   | 4,860   |
| Caviar           | 4,340   | 1,302 |           |        |               |         | 450       | 130     |
| Total            | 191,512 | 7,387 | 1,163,600 | 19,200 | 2,666,744     | 71,534  | 5,810,092 | 143,110 |

The number and value of shad taken in the waters of Virginia in 1897 are exhibited by counties in the following table:

| Counties.      | No.     | Value.  | Counties.      | No.        | Value.   |
|----------------|---------|---------|----------------|------------|----------|
| Accomac        | 75,957  | \$6,935 | Mathews        | 370,571    | \$32,425 |
| Alexandria     | 111,343 | 7,794   | Middlesex      | 6,200      | 620      |
| Caroline       | 21,964  | 1,780   | Nansemond      | 31,972     | 3,886    |
| Charles City   | 114,500 | 11,550  | New Kent       | 95,293     | 8,840    |
| Chesterfield   | 7,233   | 723     | Norfolk        | 37,000     | 4,796    |
| Dinwiddie      | 5,600   | 560     | Northampton    | 4,114      | 371      |
| Elizabeth City | 97,376  | 10,227  | Northumberland | 1,057,265  | 92,408   |
| Essex          | 47,236  | 4,462   | Princess Anne  | 26,553     | 3,717    |
| Fairfax        | 100,229 | 6,877   | Prince George  | 85,160     | 9,014    |
| Gloucester     | 157,143 | 16,500  | Prince William | 59,570     | 3,927    |
| Hanover        | 5,825   | 466     | Richmond       | 91,479     | 8,940    |
| Henrico        | 43,679  | 4,625   | Stafford       | 20,764     | 1,423    |
| Isle of Wight  | 68,865  | 9,070   | Surry          | 32,709     | 4,243    |
| James City     | 23,641  | 2,364   | Warwick        | 5,000      | 700      |
| King and Queen | 10,895  | 686     | Westmoreland   | 54,459     | 3,902    |
| King George    | 114,676 | 8,551   | York           | 23,185     | 2,655    |
| King William   | 41,488  | 2,879   |                |            |          |
| Lancaster      | 245,174 | 26,532  | Total          | 13,294,118 | 304,448  |

<sup>1</sup> 11,529,474 pounds.

## NOTES ON THE PRINCIPAL FISHERIES.

The principal fisheries are the oyster, the pound-net, the menhaden purse-seine, and the shad gill-net fisheries. The oyster yield in 1897 was valued at \$2,041,683; the product of the pound nets, \$513,589; the menhaden purse-seine fishery, \$242,300, and the shad gill-net fisheries in the rivers, \$81,171. Of minor consequence was the haul seine fishery, with a value of \$68,260, the crab fisheries, yielding products to the value of \$68,245, and the clam fisheries, with products worth \$66,097. The value of the yield of the minor fisheries in the same year was \$98,153, making the total yield of the fishery products in Virginia during 1897 worth \$3,179,498.

The oyster industry is the principal fishery in Virginia and shows a gratifying increase so far as concerns the quantity over any previous year for which records are available. In 1880 the product was 6,837,-240 bushels, for which the fishermen received \$2,218,376; in 1888 it was 3,664,433 bushels, worth \$1,336,012; in 1891, 6,074,025 bushels, worth \$2,524,348, and in 1897 7,023,848 bushels, valued at \$2,041,683. During the last year this industry gave employment to 18,189 fishermen, or 75 per cent of the total number in the State, using 1,022 vessels, valued, with their outfits, at \$662,242; 7,682 boats, worth \$416,018, and dredges, tongs, etc., worth \$73,755. This shows some increase over 1891, when the fishermen and transporters numbered 16,343; 919 vessels, worth \$786,626; 6,974 boats, worth \$412,030, and dredges, tongs, etc., worth \$57,872.

The general condition of the oyster industry of Virginia has changed considerably during the past ten years. The public reefs are growing less productive year after year and the extent of the planting business is constantly increasing. The State laws afford fairly good protection to private oyster-culture, and the prospects are exceedingly favorable for a large development in that line in the near future.

The pound-net fishery of Virginia is the most extensive and concentrated in America. The increase in this fishery during the past twenty years has been phenomenal. Within an area 70 miles long and 10 miles wide, covering the western side of Chesapeake Bay and the mouths of the tributaries thereof, there are set each spring over 850 pound nets, worth about \$200,000. In addition, there are about 100 on the eastern shore of Virginia and about 300 in the various rivers at a greater distance than 10 miles from the Chesapeake. In 1897 the number of pound nets in the State aggregated 1,250, worth \$264,600, against 891 in 1891, valued at \$165,990. In 1880 the number of pound nets was but 152, worth \$89,240, and in 1887 it was reported at 608, worth \$164,355. The catch by the pound nets in 1891 amounted to 23,796,835 pounds, which sold for \$471,560, whereas in 1897 it was 37,467,620 pounds, worth \$513,589. The principal increase occurred in the yield of shad, from 3,645,467 pounds in 1891 to 8,035,114 pounds

in 1897; squeteague, from 1,759,464 to 5,184,428 pounds; croakers, from 247,980 pounds in 1891 to 2,742,049 pounds in 1897. Blue-fish fell off from 1,292,398 pounds to 662,993 pounds; Spanish mackerel, from 725,910 to 503,106 pounds, and sturgeon, from 575,320 to 335,590 pounds, including caviar. The value per pound of nearly all of these species shows a decrease from 1891 to 1897. Had the pound-net catch sold in the latter year for as much per pound as in the former the aggregate value would have been about \$738,098, instead of \$513,589.

The gill-net fisheries of Virginia are principally for the capture of shad, but many other species are also secured. There were 9,307 nets used in 1897, worth \$46,235, and the product amounted to 4,053,779 pounds, for which the fishermen received \$110,206. Of this product 2,972,548 pounds represented shad, the value being \$81,171. Ranking next in value were sturgeon, including caviar, with a yield of 356,829 pounds, worth \$19,269; alewives, or river herring, 575,800 pounds, worth \$3,542, and striped bass, 43,567 pounds, worth \$2,862. In 1891 the value of the gill nets was approximately the same, but the yield was somewhat greater, amounting to 4,857,214 pounds, worth \$124,617.

The haul-seine fishery of Virginia, which is quite different from the menhaden purse-seine fishery, is of little value compared with former times. In the early part of the present century this was practically the only form of apparatus used for taking fish. Forty years ago nearly every large plantation bordering the rivers had a seine shore, and some of them were quite valuable. But the greater cheapness and efficiency of gill nets, pound nets, etc., has resulted in a great decrease in the number of seines employed. In 1891 there were 178 haul seines used, worth \$32,470, and yielding 4,176,362 pounds of fish, valued at \$98,074. In 1897 the number of seines was 107, valued at \$28,462, and the catch of fish aggregated 5,282,251 pounds, worth \$68,260. Among the principal species were spots, 482,965 pounds, worth \$13,279; shad, 459,057 pounds, worth \$10,258; squeteague, 439,218 pounds, worth \$9,964; alewives, or river herring, 1,937,855 pounds, worth \$13,357, and striped bass, 136,087 pounds, worth \$7,483.

The crab fisheries yielded a product in 1897 valued at \$68,245, of which \$28,331 represented hard crabs and \$39,914 soft crabs, the total weight of the former being 5,331,398 pounds and of the latter 1,068,116 pounds. The soft-crab fishery is prosecuted in Accomac, Lancaster, Northumberland, and Northampton counties, but principally in the first-named. The hard crabs are obtained in the waters of a dozen or more counties, but principally in Northampton, York, and Princess Anne. The soft crabs are caught by scrapes and dip nets, while the hard crabs are obtained by means of lines almost exclusively.

The following series of tables show in detail the extent of the fisheries by each form of apparatus in 1897.

Table showing, by counties, the yield of the seine fisheries of Virginia in 1897.

| Species.                 | Accomac.          |               | Alexandria.   |            | Caroline.     |              | Charles City. |            | Chesterfield. |            |
|--------------------------|-------------------|---------------|---------------|------------|---------------|--------------|---------------|------------|---------------|------------|
|                          | Lbs.              | Value.        | Lbs.          | Value.     | Lbs.          | Value.       | Lbs.          | Value.     | Lbs.          | Value.     |
| <b>Vessel fisheries:</b> |                   |               |               |            |               |              |               |            |               |            |
| Blue-fish .....          | 3,000             | \$75          |               |            |               |              |               |            |               |            |
| Cat-fish .....           |                   |               | 1,200         | \$36       |               |              |               |            |               |            |
| Menhaden .....           | 19,081,000        | 24,612        |               |            |               |              |               |            |               |            |
| Perch, white .....       |                   |               | 1,850         | 111        |               |              |               |            |               |            |
| Squeteague .....         |                   |               | 650           | 26         |               |              |               |            |               |            |
| Striped bass .....       |                   |               | 3,200         | 192        |               |              |               |            |               |            |
| <b>Total.....</b>        | <b>19,084,000</b> | <b>24,687</b> | <b>6,900</b>  | <b>365</b> |               |              |               |            |               |            |
| <b>Shore fisheries:</b>  |                   |               |               |            |               |              |               |            |               |            |
| Alewives, fresh .....    |                   |               |               |            | 6,000         | \$60         |               |            | 22,600        | \$338      |
| Black bass .....         |                   |               | 200           | 10         |               |              |               |            |               |            |
| Blue-fish .....          | 325               | 10            |               |            |               |              |               |            |               |            |
| Carp .....               |                   |               | 500           | 15         |               |              |               |            |               |            |
| Cat-fish .....           |                   |               | 1,600         | 50         | 6,000         | 180          |               |            |               |            |
| Croakers .....           | 25,325            | 761           |               |            |               |              | 800           | \$24       |               |            |
| Drum .....               | 440               | 11            |               |            |               |              |               |            |               |            |
| Flounders .....          | 10,175            | 148           |               |            |               |              |               |            |               |            |
| Hickory shad .....       |                   |               |               |            | 18,000        | 90           | 18,750        | 375        |               |            |
| King-fish .....          | 715               | 26            |               |            |               |              |               |            |               |            |
| Menhaden .....           | 3,000             | 15            |               |            |               |              |               |            |               |            |
| Mullet .....             | 14,166            | 277           |               |            |               |              |               |            |               |            |
| Perch, white .....       | 460               | 11            | 1,083         | 65         | 2,500         | 75           | 500           | 15         |               |            |
| Perch, yellow .....      |                   |               | 1,160         | 35         |               |              |               |            |               |            |
| Sea bass .....           | 500               | 12            |               |            |               |              |               |            |               |            |
| Shad .....               |                   |               |               |            | 6,000         | 160          |               |            | 16,917        | 483        |
| Spots .....              | 8,225             | 157           |               |            |               |              |               |            |               |            |
| Squeteague .....         | 214,855           | 5,753         |               |            |               |              | 700           | 21         |               |            |
| Striped bass .....       |                   |               |               |            | 9,000         | 450          | 2,000         | 160        |               |            |
| Sturgeon .....           |                   |               | 1,250         | 75         |               |              |               |            |               |            |
| <b>Total.....</b>        | <b>278,186</b>    | <b>7,181</b>  | <b>5,793</b>  | <b>250</b> | <b>47,500</b> | <b>1,015</b> | <b>22,750</b> | <b>595</b> | <b>39,517</b> | <b>821</b> |
| <b>Grand total ..</b>    | <b>19,362,186</b> | <b>31,868</b> | <b>12,693</b> | <b>615</b> | <b>47,500</b> | <b>1,015</b> | <b>22,750</b> | <b>595</b> | <b>39,517</b> | <b>821</b> |

| Species.                 | New Kent.      |              | Norfolk.       |               | Northampton.      |               | Northumberland.   |               | Princess Anne. |              |
|--------------------------|----------------|--------------|----------------|---------------|-------------------|---------------|-------------------|---------------|----------------|--------------|
|                          | Lbs.           | Val.         | Lbs.           | Val.          | Lbs.              | Val.          | Lbs.              | Val.          | Lbs.           | Val.         |
| <b>Vessel fisheries:</b> |                |              |                |               |                   |               |                   |               |                |              |
| Blue-fish .....          |                |              |                |               | 15,750            | \$450         |                   |               |                |              |
| Croakers .....           |                |              |                |               | 5,000             | 125           |                   |               |                |              |
| Menhaden .....           |                |              |                |               | 14,569,632        | 19,868        | 67,379,410        | \$88,240      |                |              |
| Squeteague .....         |                |              |                |               | 1,000             | 25            |                   |               |                |              |
| Crabs, hard .....        |                |              |                |               | 20,000            | 100           |                   |               |                |              |
| <b>Total.....</b>        |                |              |                |               | <b>14,611,382</b> | <b>20,568</b> | <b>67,379,410</b> | <b>88,240</b> |                |              |
| <b>Shore fisheries:</b>  |                |              |                |               |                   |               |                   |               |                |              |
| Alewives, fresh .....    | 113,045        | \$799        |                |               |                   |               |                   |               |                |              |
| Blue-fish .....          |                |              |                |               |                   |               |                   |               | 8,360          | \$240        |
| Butter-fish .....        |                |              |                |               |                   |               |                   |               | 5,000          | 250          |
| Cat-fish .....           | 1,000          | 20           |                |               |                   |               |                   |               |                |              |
| Croakers .....           |                |              | 248,000        | \$1,440       |                   |               |                   |               | 106,000        | 610          |
| Drum .....               |                |              |                |               |                   |               |                   |               | 680            | 10           |
| Flounders .....          |                |              | 1,000          | 10            |                   |               |                   |               | 1,000          | 16           |
| Hickory shad .....       | 14,500         | 185          |                |               |                   |               |                   |               |                |              |
| Hog-fish .....           |                |              | 3,750          | 225           |                   |               |                   |               | 4,340          | 195          |
| King-fish .....          |                |              |                |               | 500               | 50            |                   |               | 1,700          | 68           |
| Menhaden .....           |                |              |                |               |                   |               |                   |               | 100,000        | 100          |
| Mullet .....             |                |              | 11,800         | 482           |                   |               |                   |               | 8,920          | 105          |
| Perch, white .....       |                |              | 1,000          | 20            |                   |               |                   |               | 1,500          | 45           |
| Perch, yellow .....      | 500            | 25           |                |               |                   |               |                   |               |                |              |
| Shad .....               | 49,000         | 1,400        |                |               |                   |               |                   |               |                |              |
| Spots .....              |                |              | 223,500        | 6,580         | 12,000            | 360           |                   |               | 228,000        | 5,790        |
| Squeteague .....         |                |              | 88,000         | 1,775         | 7,208             | 223           |                   |               | 67,000         | 1,310        |
| <b>Total.....</b>        | <b>178,045</b> | <b>2,429</b> | <b>577,050</b> | <b>10,532</b> | <b>19,708</b>     | <b>633</b>    |                   |               | <b>532,500</b> | <b>8,739</b> |
| <b>Grand total ..</b>    | <b>178,045</b> | <b>2,429</b> | <b>577,050</b> | <b>10,532</b> | <b>14,631,090</b> | <b>21,201</b> | <b>67,379,410</b> | <b>88,240</b> | <b>532,500</b> | <b>8,739</b> |

Table showing the yield of the seine fisheries of Virginia in 1897—Continued.

| Species.              | Elizabeth City. |          | Essex. |        | Fairfax. |         | Henrico. |        | Isle of Wight. |        |
|-----------------------|-----------------|----------|--------|--------|----------|---------|----------|--------|----------------|--------|
|                       | Lbs.            | Value.   | Lbs.   | Value. | Lbs.     | Value.  | Lbs.     | Value. | Lbs.           | Value. |
| Vessel fisheries:     |                 |          |        |        |          |         |          |        |                |        |
| Menhaden .....        | 10,164,000      | \$23,760 |        |        |          |         |          |        |                |        |
| Shore fisheries:      |                 |          |        |        |          |         |          |        |                |        |
| Alewives, fresh ..... |                 |          | 5,000  | \$50   | 643,410  | \$3,217 |          |        |                |        |
| Carp .....            |                 |          |        |        | 482      | 10      |          |        |                |        |
| Cat-fish .....        |                 |          | 17,500 | 525    | 2,885    | 87      | 1,500    | \$30   |                |        |
| Croakers .....        |                 |          |        |        |          |         |          |        | 500            | \$10   |
| Hickory shad .....    |                 |          |        |        |          |         | 15,000   | 150    | 6,000          | 180    |
| Perch, white .....    |                 |          | 5,300  | 355    | 4,539    | 272     | 1,000    | 50     | 500            | 20     |
| Perch, yellow .....   |                 |          |        |        | 500      | 13      | 500      | 25     |                |        |
| Shad .....            |                 |          | 45,000 | 1,350  | 175,686  | 3,543   | 6,300    | 180    |                |        |
| Striped bass .....    |                 |          | 6,500  | 605    | 9,447    | 559     | 7,000    | 490    | 3,000          | 210    |
| Sturgeon .....        |                 |          |        |        | 100      | 4       |          |        |                |        |
| Suckers .....         |                 |          |        |        | 1,500    | 45      |          |        | 1,000          | 20     |
| Total .....           |                 |          | 79,300 | 2,885  | 838,549  | 7,750   | 31,300   | 925    | 11,000         | 440    |
| Grand total ..        | 10,164,000      | 23,760   | 79,300 | 2,885  | 838,549  | 7,750   | 31,300   | 925    | 11,000         | 440    |

| Species.              | James City. |        | King George. |        | King William. |        | Lancaster. |          | Nansemond. |        |
|-----------------------|-------------|--------|--------------|--------|---------------|--------|------------|----------|------------|--------|
|                       | Lbs.        | Value. | Lbs.         | Value. | Lbs.          | Value. | Lbs.       | Value.   | Lbs.       | Value. |
| Vessel fisheries:     |             |        |              |        |               |        |            |          |            |        |
| Menhaden .....        |             |        |              |        |               |        | 60,074,000 | \$85,820 |            |        |
| Shore fisheries:      |             |        |              |        |               |        |            |          |            |        |
| Alewives, fresh ..... | 42,000      | \$309  | 3,800        | \$29   | 16,000        | \$260  |            |          |            |        |
| Blue-fish .....       |             |        |              |        |               |        |            |          | 1,250      | \$38   |
| Butter-fish .....     |             |        |              |        |               |        |            |          | 16,250     | 325    |
| Cat-fish .....        | 1,500       | 45     | 5,050        | 152    | 14,750        | 295    |            |          |            |        |
| Croakers .....        |             |        | 200          | 6      |               |        |            |          | 29,500     | 170    |
| Eels .....            |             |        | 1,250        | 43     |               |        |            |          |            |        |
| Flounders .....       |             |        |              |        |               |        |            |          | 625        | 19     |
| Menhaden .....        |             |        |              |        |               |        | 926,000    | 1,324    | 50,000     | 125    |
| Perch, white .....    | 1,200       | 36     | 4,974        | 283    | 7,600         | 480    |            |          | 150        | 3      |
| Perch, yellow .....   |             |        | 2,600        | 65     | 1,000         | 30     |            |          |            |        |
| Shad .....            | 1,400       | 40     | 849          | 18     | 1,800         | 38     |            |          | 4,000      | 125    |
| Spots .....           |             |        |              |        |               |        |            |          | 2,815      | 141    |
| Squeteague .....      |             |        |              |        | 300           | 6      | 5,000      | 150      | 50,756     | 510    |
| Striped bass .....    | 3,000       | 210    | 10,360       | 621    | 2,700         | 270    |            |          | 650        | 52     |
| Sturgeon .....        | 1,810       | 90     |              |        |               |        |            |          |            |        |
| Suckers .....         |             |        |              |        | 7,250         | 145    |            |          |            |        |
| Total .....           | 50,910      | 730    | 29,083       | 1,217  | 51,400        | 1,524  | 931,000    | 1,474    | 155,990    | 1,508  |
| Grand total ..        | 50,910      | 730    | 29,083       | 1,217  | 51,400        | 1,524  | 61,005,000 | 87,294   | 155,990    | 1,508  |

| Species.               | Prince George. |      | Prince William. |         | Stafford. |         | Surry. |      | Warwick. |      | Westmoreland. |       |
|------------------------|----------------|------|-----------------|---------|-----------|---------|--------|------|----------|------|---------------|-------|
|                        | Lbs.           | Val. | Lbs.            | Val.    | Lbs.      | Val.    | Lbs.   | Val. | Lbs.     | Val. | Lbs.          | Val.  |
| Shore fisheries:       |                |      |                 |         |           |         |        |      |          |      |               |       |
| Alewives, fresh .....  |                |      | 232,000         | \$1,290 | 450,000   | \$3,025 |        |      |          |      | 24,000        | \$180 |
| Alewives, salted ..... |                |      |                 |         | 380,000   | 3,800   |        |      |          |      |               |       |
| Black bass .....       | 3,000          | \$60 |                 |         |           |         |        |      |          |      |               |       |
| Blue-fish .....        |                |      |                 |         |           |         |        |      | 2,000    | \$40 | 2,550         | 96    |
| Butter-fish .....      |                |      |                 |         |           |         |        |      |          |      | 200           | 4     |
| Cat-fish .....         | 5,000          | 100  | 5,100           | 161     | 3,650     | 112     | 1,500  | \$45 |          |      | 6,500         | 158   |
| Croakers .....         |                |      |                 |         |           |         |        |      | 7,000    | 35   | 130           | 3     |
| Eels .....             |                |      |                 |         |           |         |        |      |          |      | 175           | 3     |
| Flounders .....        |                |      |                 |         |           |         |        |      | 2,000    | 40   | 350           | 9     |
| Perch, white .....     |                |      | 7,450           | 447     | 8,350     | 386     | 3,000  | 60   |          |      | 5,000         | 169   |
| Perch, yellow .....    |                |      | 2,950           | 74      | 300       | 8       |        |      |          |      | 1,500         | 45    |
| Pike .....             |                |      |                 |         |           |         |        |      |          |      | 200           | 6     |
| Shad .....             | 210            | 6    | 90,270          | 1,700   | 61,625    | 1,215   |        |      |          |      |               |       |
| Spots .....            |                |      |                 |         |           |         |        |      | 8,000    | 240  | 425           | 11    |
| Squeteague .....       |                |      |                 |         |           |         |        |      |          |      | 5,405         | 216   |
| Striped bass .....     |                |      | 28,765          | 1,407   | 43,165    | 1,909   | 1,500  | 105  |          |      | 9,000         | 435   |
| Suckers .....          |                |      |                 |         |           |         |        |      |          |      | 200           | 6     |
| Sun-fish .....         |                |      |                 |         |           |         |        |      |          |      | 200           | 6     |
| Total .....            | 8,210          | 166  | 366,535         | 5,079   | 947,090   | 10,455  | 6,000  | 210  | 19,000   | 355  | 55,835        | 1,247 |



Table showing the yield of the seine fisheries of Virginia in 1897—Continued.

## SUMMARY.

| Species.                 | Lbs.               | Value.         | Species.                       | Lbs.               | Value.         |
|--------------------------|--------------------|----------------|--------------------------------|--------------------|----------------|
| <b>Vessel fisheries:</b> |                    |                | <b>Shore fisheries—Cont'd.</b> |                    |                |
| Blue-fish.....           | 18,750             | \$525          | Flounders.....                 | 15,150             | \$242          |
| Cat-fish.....            | 1,200              | 36             | Hickory shad.....              | 72,250             | 980            |
| Croakers.....            | 5,000              | 125            | Hog-fish.....                  | 8,090              | 420            |
| Menhaden.....            | 171,268,042        | 242,300        | King-fish.....                 | 2,915              | 144            |
| Perch, white.....        | 1,850              | 111            | Menhaden.....                  | 1,079,000          | 1,564          |
| Squeteague.....          | 1,650              | 51             | Mullet.....                    | 34,886             | 864            |
| Striped bass.....        | 3,200              | 192            | Perch, white.....              | 56,106             | 2,792          |
| Crabs, hard.....         | 20,000             | 100            | Perch, yellow.....             | 11,010             | 320            |
| <b>Total.....</b>        | <b>171,319,692</b> | <b>243,440</b> | Pike.....                      | 200                | 6              |
| <b>Shore fisheries:</b>  |                    |                | Sea bass.....                  | 500                | 12             |
| Alewives fresh.....      | 1,557,855          | 9,557          | Shad.....                      | 459,057            | 10,258         |
| Alewives, salted.....    | 380,000            | 3,800          | Spots.....                     | 482,965            | 13,279         |
| Black bass.....          | 3,200              | 70             | Squeteague.....                | 439,218            | 9,964          |
| Blue-fish.....           | 14,485             | 424            | Striped bass.....              | 136,087            | 7,483          |
| Butter-fish.....         | 21,450             | 579            | Sturgeon.....                  | 3,160              | 169            |
| Carp.....                | 982                | 25             | Suckers.....                   | 9,950              | 216            |
| Cat-fish.....            | 78,535             | 1,960          | Sun-fish.....                  | 200                | 6              |
| Croakers.....            | 417,455            | 3,059          | <b>Total.....</b>              | <b>5,282,251</b>   | <b>68,260</b>  |
| Drum.....                | 1,120              | 21             | <b>Grand total.....</b>        | <b>176,601,943</b> | <b>311,700</b> |
| Eels.....                | 1,425              | 46             |                                |                    |                |

Table showing, by counties and species, the catch by gill nets used in the shore fisheries of Virginia in 1897.

| Counties.           | Alewives.      |              | Black bass.   |            | Blue-fish.    |            | Cat-fish.    |           | Croakers.  |           |
|---------------------|----------------|--------------|---------------|------------|---------------|------------|--------------|-----------|------------|-----------|
|                     | Lbs.           | Value.       | Lbs.          | Value.     | Lbs.          | Value.     | Lbs.         | Value.    | Lbs.       | Value.    |
| Alexandria.....     | 70,000         | \$350        |               |            |               |            |              |           |            |           |
| Charles City.....   | 22,400         | 168          | 3,400         | \$144      |               |            |              |           |            |           |
| Essex.....          | 11,000         | 125          |               |            |               |            |              |           |            |           |
| Hanover.....        | 10,900         | 216          |               |            |               |            |              |           |            |           |
| Henrico.....        | 112,200        | 820          |               |            |               |            |              |           |            |           |
| King George.....    | 43,200         | 216          |               |            |               |            |              |           |            |           |
| King William.....   | 2,500          | 40           |               |            |               |            | 2,000        | \$40      |            |           |
| Mathews.....        |                |              |               |            | 500           | \$25       |              |           |            |           |
| New Kent.....       | 33,600         | 252          | 6,600         | 396        |               |            |              |           |            |           |
| Prince William..... | 168,000        | 840          |               |            |               |            |              |           |            |           |
| Stafford.....       | 100,000        | 500          |               |            |               |            |              |           |            |           |
| Westmoreland.....   | 2,000          | 15           |               |            |               |            |              |           |            |           |
| York.....           |                |              |               |            | 9,600         | 288        |              |           | 500        | \$10      |
| <b>Total.....</b>   | <b>575,800</b> | <b>3,542</b> | <b>10,000</b> | <b>540</b> | <b>10,100</b> | <b>313</b> | <b>2,000</b> | <b>40</b> | <b>500</b> | <b>10</b> |

| Counties.          | Hickory shad. |          | King-fish. |           | Mullet.      |            | Perch, white. |              | Perch, yellow. |            |
|--------------------|---------------|----------|------------|-----------|--------------|------------|---------------|--------------|----------------|------------|
|                    | Lbs.          | Value.   | Lbs.       | Value.    | Lbs.         | Value.     | Lbs.          | Value.       | Lbs.           | Value.     |
| Accomac.....       |               |          | 400        | \$10      | 510          | \$25       |               |              |                |            |
| Charles City.....  |               |          |            |           |              |            | 1,000         | \$50         | 2,800          | \$84       |
| Isle of Wight..... |               |          |            |           |              |            | 15,000        | 600          |                |            |
| James City.....    |               |          |            |           |              |            | 10,000        | 400          |                |            |
| King William.....  |               |          |            |           |              |            | 500           | 20           | 400            | 12         |
| Mathews.....       | 400           | \$8      |            |           | 4,000        | 80         | 400           | 20           |                |            |
| New Kent.....      |               |          |            |           |              |            | 2,000         | 100          | 4,200          | 126        |
| Prince George..... |               |          |            |           |              |            | 800           | 16           | 600            | 12         |
| Surry.....         |               |          |            |           |              |            | 2,000         | 60           |                |            |
| York.....          |               |          |            |           |              |            | 200           | 8            |                |            |
| <b>Total.....</b>  | <b>400</b>    | <b>8</b> | <b>400</b> | <b>10</b> | <b>4,510</b> | <b>105</b> | <b>31,900</b> | <b>1,274</b> | <b>8,000</b>   | <b>234</b> |



## 302 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties and species, the catch by gill nets used in the shore fisheries of Virginia in 1897—Continued.

| Counties.           | Spots. |        | Squeteague. |        | Striped bass. |        | Sturgeon. |         |         |         |
|---------------------|--------|--------|-------------|--------|---------------|--------|-----------|---------|---------|---------|
|                     | Lbs.   | Value. | Lbs.        | Value. | Lbs.          | Value. | Flesh.    |         | Caviar. |         |
|                     |        |        |             |        |               |        | Lbs.      | Value.  | Lbs.    | Value.  |
| Accomac.....        | 100    | \$6    | 2,125       | \$85   |               |        |           |         |         |         |
| Alexandria.....     |        |        |             |        | 500           | \$30   |           |         |         |         |
| Charles City.....   |        |        |             |        | 4,000         | 280    | 63,625    | \$1,188 | 5,320   | \$1,596 |
| Essex.....          |        |        |             |        |               |        | 600       | 12      | 140     | 40      |
| Fairfax.....        |        |        |             |        | 375           | 23     |           |         |         |         |
| Henrico.....        |        |        |             |        |               |        | 5,000     | 100     | 1,040   | 312     |
| Isle of Wight.....  |        |        | 30,000      | 600    | 20,000        | 1,400  | 23,100    | 462     | 3,640   | 1,092   |
| James City.....     |        |        |             |        | 6,100         | 427    | 27,915    | 487     | 5,600   | 1,600   |
| King George.....    |        |        |             |        | 225           | 14     | 19,759    | 1,085   | 1,240   | 460     |
| King William.....   |        |        |             |        | 100           | 8      | 6,225     | 125     | 1,660   | 498     |
| Mathews.....        | 2,000  | 80     | 600         | 6      |               |        |           |         |         |         |
| New Kent.....       |        |        |             |        | 6,000         | 420    | 20,000    | 400     | 3,750   | 1,125   |
| Princess Anne.....  |        |        |             |        |               |        | 43,000    | 1,720   | 6,065   | 1,820   |
| Prince George.....  |        |        |             |        |               |        | 65,850    | 1,238   | 5,810   | 1,743   |
| Prince William..... |        |        |             |        | 225           | 14     |           |         |         |         |
| Stafford.....       |        |        |             |        | 100           | 8      |           |         |         |         |
| Surry.....          |        |        |             |        | 5,942         | 238    | 43,150    | 864     | 4,340   | 1,302   |
| York.....           | 100    | 5      | 300         | 6      |               |        |           |         |         |         |
| Total.....          | 2,200  | 91     | 33,025      | 697    | 43,567        | 2,862  | 318,224   | 7,681   | 38,605  | 11,588  |

| Counties.           | Shad.     |         | Suckers. |        | Sun-fish. |        | Total.    |         |
|---------------------|-----------|---------|----------|--------|-----------|--------|-----------|---------|
|                     | Lbs.      | Value.  | Lbs.     | Value. | Lbs.      | Value. | Lbs.      | Value.  |
| Accomac.....        |           |         |          |        |           |        | 3,135     | \$126   |
| Alexandria.....     | 389,700   | \$7,794 |          |        |           |        | 460,200   | 8,174   |
| Caroline.....       | 13,125    | 300     |          |        |           |        | 13,125    | 300     |
| Charles City.....   | 400,750   | 11,550  |          |        |           |        | 503,295   | 15,060  |
| Chesterfield.....   | 8,400     | 240     |          |        |           |        | 8,400     | 240     |
| Dinwiddie.....      | 19,600    | 560     |          |        |           |        | 19,600    | 560     |
| Essex.....          | 62,548    | 1,609   |          |        |           |        | 74,288    | 1,786   |
| Fairfax.....        | 117,318   | 2,246   |          |        |           |        | 117,693   | 2,269   |
| Hanover.....        | 20,387    | 466     |          |        |           |        | 31,287    | 682     |
| Henrico.....        | 124,700   | 3,820   |          |        |           |        | 242,940   | 5,052   |
| Isle of Wight.....  | 241,026   | 9,070   |          |        |           |        | 332,766   | 13,224  |
| James City.....     | 81,342    | 2,324   |          |        |           |        | 130,957   | 5,238   |
| King George.....    | 168,630   | 3,590   |          |        |           |        | 233,054   | 5,365   |
| King and Queen..... | 38,133    | 686     |          |        |           |        | 38,133    | 686     |
| King William.....   | 137,981   | 2,660   | 1,500    | \$30   |           |        | 152,866   | 3,433   |
| Mathews.....        |           |         |          |        |           |        | 7,900     | 219     |
| Nansemond.....      | 53,500    | 1,948   |          |        |           |        | 53,500    | 1,948   |
| New Kent.....       | 284,526   | 7,440   |          |        |           |        | 360,676   | 10,259  |
| Norfolk.....        | 84,000    | 3,081   |          |        |           |        | 84,000    | 3,081   |
| Princess Anne.....  | 52,500    | 2,100   |          |        |           |        | 101,565   | 5,640   |
| Prince George.....  | 297,850   | 9,008   |          |        | 500       | \$10   | 371,410   | 12,027  |
| Prince William..... | 89,716    | 1,639   |          |        |           |        | 257,941   | 2,543   |
| Richmond.....       | 147,500   | 4,093   |          |        |           |        | 147,500   | 4,093   |
| Stafford.....       | 8,712     | 164     |          |        |           |        | 108,812   | 672     |
| Surry.....          | 114,480   | 4,243   |          |        |           |        | 169,912   | 6,707   |
| Warwick.....        | 7,000     | 280     |          |        |           |        | 7,000     | 280     |
| Westmoreland.....   | 9,124     | 210     |          |        |           |        | 11,124    | 225     |
| York.....           |           |         |          |        |           |        | 10,700    | 317     |
| Total.....          | 2,972,548 | 81,171  | 1,500    | 30     | 500       | 10     | 4,053,779 | 110,206 |

Table showing by counties the catch by pound nets in the shore fisheries of Virginia in 1897.

| Species.               | Accomac.    |         | Caroline. |          | Elizabeth City. |          | Essex.   |          | Fairfax. |          |
|------------------------|-------------|---------|-----------|----------|-----------------|----------|----------|----------|----------|----------|
|                        | Lbs.        | Value.  | Lbs.      | Value.   | Lbs.            | Value.   | Lbs.     | Value.   | Lbs.     | Value.   |
| Alewives, fresh ..     | 173, 450    | \$625   | 165, 000  | \$1, 980 | 264, 482        | \$2, 857 | 123, 322 | \$1, 348 | 297, 332 | \$1, 736 |
| Black bass .....       |             |         |           |          |                 |          |          |          | 400      | 20       |
| Blue-fish .....        | 120, 089    | 3, 696  |           |          | 180, 115        | 5, 403   |          |          |          |          |
| Bonito .....           | 6, 150      | 184     |           |          |                 |          |          |          |          |          |
| Butter-fish .....      | 9, 000      | 220     |           |          | 52, 628         | 1, 576   |          |          |          |          |
| Carp .....             |             |         |           |          |                 |          |          |          | 600      | 18       |
| Cat-fish .....         | 3, 830      | 216     |           |          |                 |          | 23, 600  | 708      | 31, 600  | 948      |
| Cero .....             | 1, 100      | 70      |           |          |                 |          |          |          |          |          |
| Croakers .....         | 155, 950    | 1, 547  |           |          | 899, 164        | 4, 496   |          |          |          |          |
| Drum .....             | 21, 250     | 166     |           |          | 2, 400          | 24       |          |          |          |          |
| Eels .....             |             |         |           |          |                 |          | 4, 000   | 160      |          |          |
| Flounders .....        | 8, 550      | 161     |           |          | 51, 485         | 1, 554   |          |          |          |          |
| Hickory shad .....     |             |         |           |          | 2, 740          | 55       |          |          |          |          |
| King-fish .....        | 300         | 30      |           |          | 1, 600          | 64       |          |          |          |          |
| Mackerel .....         | 100         | 12      |           |          |                 |          |          |          |          |          |
| Menhaden .....         | 294, 100    | 325     |           |          | 1, 841, 500     | 4, 609   | 52, 000  | 35       |          |          |
| Mullet .....           | 200         | 2       |           |          |                 |          |          |          |          |          |
| Perch, white .....     | 9, 600      | 384     |           |          | 3, 400          | 170      | 2, 050   | 103      | 25, 025  | 1, 502   |
| Perch, yellow .....    |             |         |           |          |                 |          | 200      | 6        | 11, 650  | 291      |
| Pike .....             |             |         |           |          |                 |          |          |          | 450      | 36       |
| Pompano .....          | 11, 835     | 858     |           |          | 12, 055         | 951      |          |          |          |          |
| Shad .....             | 265, 550    | 6, 923  | 57, 750   | 1, 320   | 340, 816        | 10, 227  | 55, 080  | 1, 413   | 57, 799  | 1, 088   |
| Sheepshead .....       | 1, 135      | 91      |           |          |                 |          |          |          |          |          |
| Spanish mackerel ..... | 102, 080    | 7, 021  |           |          | 39, 525         | 2, 193   |          |          |          |          |
| Spots .....            | 26, 091     | 173     |           |          | 29, 149         | 583      |          |          |          |          |
| Squeteague .....       | 118, 765    | 1, 895  |           |          | 1, 090, 874     | 16, 363  |          |          |          |          |
| Striped bass .....     | 5, 200      | 416     |           |          |                 |          | 5, 200   | 499      | 25, 175  | 1, 511   |
| Sturgeon .....         | 22, 028     | 1, 311  |           |          | 24, 757         | 496      |          |          |          |          |
| Suckers .....          |             |         |           |          |                 |          | 300      | 6        | 3, 500   | 70       |
| Whiting .....          |             |         |           |          | 5, 000          | 100      |          |          |          |          |
| Turtles .....          |             |         |           |          | 5, 750          | 115      |          |          |          |          |
| Caviar .....           | 100         | 40      |           |          | 3, 570          | 1, 071   |          |          |          |          |
| Total .....            | 1, 356, 450 | 26, 366 | 222, 750  | 3, 300   | 4, 851, 010     | 52, 907  | 265, 752 | 4, 278   | 453, 531 | 7, 220   |

| Species.*           | Nansemond. |        | Northampton. |          | Northumberland. |           | Norfolk. |        | Princess Anne. |         |
|---------------------|------------|--------|--------------|----------|-----------------|-----------|----------|--------|----------------|---------|
|                     | Lbs.       | Value. | Lbs.         | Value.   | Lbs.            | Value.    | Lbs.     | Value. | Lbs.           | Value.  |
| Alewives, fresh ..  | 800        | \$8    | 773, 250     | \$1, 581 | 5, 128, 914     | \$17, 774 | 45, 000  | \$475  | 16, 000        | \$160   |
| Alewives, salted .. |            |        |              |          | 38, 000         | 332       |          |        |                |         |
| Blue-fish .....     | 3, 750     | 113    | 71, 740      | 2, 025   | 4, 885          | 147       | 1, 300   | 65     | 225, 409       | 3, 431  |
| Bonito .....        |            |        | 6, 700       | 179      |                 |           |          |        | 6, 500         | 195     |
| Butter-fish .....   | 48, 750    | 975    | 12, 100      | 268      | 2, 750          | 83        | 24, 000  | 960    | 235, 150       | 5, 063  |
| Cat-fish .....      | 100        | 3      |              |          | 875             | 27        |          |        |                |         |
| Cero .....          |            |        | 100          | 3        |                 |           |          |        |                |         |
| Crevalle .....      |            |        | 6, 300       | 153      |                 |           |          |        | 117, 000       | 2, 370  |
| Croakers .....      | 93, 000    | 530    | 78, 200      | 802      | 7, 400          | 148       | 35, 000  | 350    | 888, 935       | 4, 499  |
| Drum .....          |            |        | 31, 500      | 161      |                 |           | 1, 000   | 10     | 14, 000        | 140     |
| Eels .....          |            |        |              |          | 100             | 3         |          |        |                |         |
| Flounders .....     | 1, 875     | 56     | 3, 900       | 132      | 72, 310         | 3, 196    | 1, 000   | 10     |                |         |
| Hickory shad .....  |            |        |              |          | 83, 746         | 1, 611    |          |        |                |         |
| Hog-fish .....      |            |        | 200          | 10       |                 |           |          |        | 6, 000         | 480     |
| King-fish .....     |            |        | 3, 550       | 358      |                 |           | 25, 000  | 1, 000 | 75, 800        | 3, 032  |
| Mackerel .....      |            |        | 200          | 6        |                 |           |          |        |                |         |
| Menhaden .....      | 450, 000   | 1, 125 | 154, 600     | 281      | 2, 064, 920     | 2, 640    |          |        |                |         |
| Moon-fish .....     |            |        | 16, 848      | 408      |                 |           |          |        | 11, 646        | 319     |
| Mullet .....        |            |        |              |          |                 |           |          |        | 14, 325        | 213     |
| Perch, white .....  | 1, 300     | 50     |              |          | 1, 225          | 38        | 200      | 6      | 500            | 15      |
| Pompano .....       |            |        | 7, 620       | 843      | 3, 025          | 151       | 4, 000   | 280    | 27, 000        | 2, 160  |
| Scup .....          |            |        |              |          |                 |           |          |        | 4, 000         | 120     |
| Shad .....          | 23, 800    | 823    | 14, 200      | 361      | 3, 700, 429     | 92, 408   | 45, 500  | 1, 715 | 40, 437        | 1, 617  |
| Sheepshead .....    |            |        | 700          | 68       |                 |           |          |        | 21, 500        | 1, 290  |
| Spanish mackerel .. |            |        | 95, 125      | 9, 513   | 3, 576          | 322       | 1, 700   | 85     | 239, 300       | 19, 054 |
| Spots .....         | 937        | 47     | 51, 300      | 570      | 1, 950          | 79        | 25, 000  | 750    | 301, 500       | 7, 148  |
| Squeteague .....    | 151, 500   | 1, 515 | 919, 000     | 9, 750   | 20, 850         | 491       | 91, 000  | 1, 015 | 2, 325, 487    | 22, 684 |
| Striped bass .....  | 2, 500     | 200    | 3, 300       | 330      | 65, 917         | 5, 779    | 18, 000  | 540    | 37, 950        | 1, 227  |
| Sturgeon .....      | 1, 000     | 20     | 2, 880       | 89       | 117, 273        | 3, 172    | 2, 400   | 120    | 25, 400        | 1, 056  |
| Whiting .....       |            |        |              |          |                 |           |          |        | 7, 600         | 140     |
| Turtles .....       |            |        |              |          | 13, 875         | 199       |          |        |                |         |
| Caviar .....        |            |        |              |          | 7, 000          | 2, 000    | 200      | 50     | 2, 555         | 752     |
| Total .....         | 779, 312   | 5, 465 | 2, 253, 313  | 27, 891  | 11, 339, 020    | 130, 600  | 320, 300 | 7, 431 | 4, 643, 994    | 77, 165 |

Table showing the catch by pound nets in the shore fisheries of Virginia in 1897—Continued.

| Species.         | Gloucester. |         | King George. |         | Lancaster. |         | Mathews.  |         | Middlesex. |       |
|------------------|-------------|---------|--------------|---------|------------|---------|-----------|---------|------------|-------|
|                  | Lbs.        | Val.    | Lbs.         | Val.    | Lbs.       | Val.    | Lbs.      | Val.    | Lbs.       | Val.  |
| Alewives, fresh  | 119,000     | \$1,190 | 1,275,400    | \$7,943 | 225,500    | \$1,390 | 413,400   | \$2,067 | 32,000     | \$320 |
| Alewives, salted |             |         | 6,000        | 60      |            |         |           |         |            |       |
| Blue-fish        | 25,200      | 756     |              |         | 14,100     | 583     | 13,000    | 650     |            |       |
| Butter-fish      |             |         |              |         | 60,000     | 900     |           |         |            |       |
| Cat-fish         |             |         | 91,215       | 2,314   |            |         |           |         |            |       |
| Croakers         | 330,000     | 1,650   | 6,200        | 196     | 60,000     | 300     | 20,000    | 200     |            |       |
| Drum             | 27,500      | 275     |              |         |            |         |           |         |            |       |
| Flounders        |             |         | 650          | 20      | 50,000     | 500     | 13,000    | 260     |            |       |
| Hickory shad     |             |         |              |         |            |         | 37,780    | 755     |            |       |
| Menhaden         | 220,000     | 550     |              |         | 581,200    | 965     | 390,000   | 585     | 16,000     | 40    |
| Perch, white     |             |         | 47,060       | 2,361   |            |         |           |         |            |       |
| Perch, yellow    |             |         | 500          | 13      |            |         |           |         |            |       |
| Pike             |             |         | 100          | 8       |            |         |           |         |            |       |
| Pompano          |             |         |              |         | 600        | 72      |           |         |            |       |
| Shad             | 550,000     | 16,500  | 231,887      | 4,943   | 858,110    | 26,532  | 1,297,000 | 32,425  | 21,700     | 620   |
| Spanish mackerel | 11,000      | 660     |              |         | 10,400     | 1,031   |           |         |            |       |
| Spots            |             |         |              |         | 2,000      | 60      |           |         |            |       |
| Squeteague       | 165,000     | 2,475   | 825          | 33      | 125,200    | 3,006   | 69,780    | 698     |            |       |
| Striped bass     |             |         | 95,794       | 5,174   | 3,000      | 180     |           |         |            |       |
| Sturgeon         | 24,750      | 495     |              |         | 31,000     | 620     | 55,600    | 1,240   |            |       |
| Turtles          | 9,000       | 180     |              |         |            |         | 25,000    | 500     |            |       |
| Caviar           | 3,500       | 1,050   |              |         | 4,340      | 1,302   | 3,640     | 1,040   |            |       |
| Total            | 1,484,950   | 25,781  | 1,755,631    | 23,065  | 2,025,450  | 37,445  | 2,338,200 | 40,420  | 69,700     | 980   |

| Species.         | Prince William. |       | Richmond. |         | Stafford. |       | Warwick. |      | Westmoreland. |         | York.   |       |
|------------------|-----------------|-------|-----------|---------|-----------|-------|----------|------|---------------|---------|---------|-------|
|                  | Lbs.            | Val.  | Lbs.      | Val.    | Lbs.      | Val.  | Lbs.     | Val. | Lbs.          | Val.    | Lbs.    | Val.  |
| Alewives, fresh  | 168,000         | \$840 | 257,500   | \$3,050 | 178,280   | \$940 |          |      | 1,256,000     | \$5,480 | 33,000  | \$180 |
| Alewives, salted |                 |       |           |         | 26,000    | 260   |          |      | 22,000        | 215     |         |       |
| Blue-fish        |                 |       |           |         |           |       |          |      | 905           | 34      | 2,500   | 75    |
| Carp             |                 |       |           |         | 812       | 49    |          |      | 800           | 16      |         |       |
| Cat-fish         | 850             | 26    | 49,000    | 1,290   | 16,137    | 489   |          |      | 32,850        | 604     |         |       |
| Croakers         |                 |       |           |         |           |       |          |      | 2,200         | 66      | 166,000 | 1,615 |
| Eels             |                 |       | 15,000    | 600     | 2,175     | 93    |          |      |               |         |         |       |
| Flounders        |                 |       |           |         |           |       | 500      | \$10 | 2,470         | 69      | 6,000   | 240   |
| Menhaden         |                 |       | 235,000   | 193     |           |       |          |      |               |         | 10,000  | 25    |
| Mullet           |                 |       | 600       | 12      |           |       |          |      |               |         |         |       |
| Perch, white     | 8,550           | 438   | 12,000    | 600     | 11,500    | 798   |          |      | 11,023        | 469     |         |       |
| Perch, yellow    | 3,000           | 90    | 2,000     | 60      | 60,025    | 1,501 |          |      | 750           | 23      |         |       |
| Pike             |                 |       |           |         | 28,875    | 2,310 |          |      |               |         |         |       |
| Shad             | 28,560          | 538   | 172,675   | 4,847   | 2,337     | 44    | 10,500   | 420  | 181,484       | 3,692   | 79,500  | 2,600 |
| Spanish mackerel |                 |       |           |         |           |       |          |      |               |         | 400     | 32    |
| Spots            |                 |       |           |         |           |       |          |      |               |         | 6,600   | 252   |
| Squeteague       |                 |       | 7,000     | 210     |           |       | 1,000    | 20   | 3,147         | 118     | 95,000  | 1,760 |
| Striped bass     | 6,275           | 327   | 39,000    | 3,355   | 1,754     | 106   |          |      | 47,118        | 1,970   |         |       |
| Sturgeon         |                 |       |           |         |           |       |          |      |               |         | 3,150   | 94    |
| Caviar           |                 |       |           |         |           |       |          |      |               |         | 450     | 130   |
| Total            | 215,235         | 2,259 | 789,775   | 14,217  | 327,895   | 6,590 | 12,000   | 450  | 1,560,752     | 12,756  | 402,600 | 7,008 |

## SUMMARY.

| Species.         | Lbs.       | Value.   | Species.         | Lbs.       | Value.  |
|------------------|------------|----------|------------------|------------|---------|
| Alewives, fresh  | 10,945,630 | \$51,944 | Mullet           | 15,125     | \$227   |
| Alewives, salted | 92,000     | 867      | Perch, white     | 133,438    | 6,934   |
| Black bass       | 400        | 20       | Perch, yellow    | 78,125     | 1,934   |
| Blue-fish        | 662,993    | 16,978   | Pike             | 29,425     | 2,354   |
| Bonito           | 19,350     | 558      | Pompano          | 66,135     | 5,315   |
| Butter-fish      | 444,378    | 10,045   | Scup             | 4,000      | 120     |
| Carp             | 2,212      | 83       | Shad             | 8,035,114  | 211,056 |
| Cat-fish         | 250,057    | 6,625    | Sheepshead       | 23,335     | 1,449   |
| Cero             | 1,200      | 73       | Spanish mackerel | 508,106    | 39,911  |
| Crevalle         | 123,300    | 2,523    | Spots            | 444,527    | 9,662   |
| Croakers         | 2,742,049  | 16,399   | Squeteague       | 5,184,428  | 62,033  |
| Drum             | 97,650     | 776      | Striped bass     | 356,183    | 21,614  |
| Eels             | 21,275     | 856      | Sturgeon         | 310,235    | 8,713   |
| Flounders        | 211,740    | 6,208    | Suckers          | 3,800      | 76      |
| Hickory shad     | 124,266    | 2,421    | Whiting          | 12,600     | 240     |
| Hog-fish         | 6,200      | 490      | Turtles          | 53,625     | 994     |
| King-fish        | 106,250    | 4,484    | Caviar           | 25,355     | 7,435   |
| Mackerel         | 300        | 18       |                  |            |         |
| Menhaden         | 6,309,320  | 11,377   | Total            | 37,467,620 | 513,589 |
| Moon-fish        | 28,494     | 727      |                  |            |         |

Table showing, by counties, the yield of the fyke-net fisheries of Virginia in 1897.

| Species.           | Accomac. |        | Essex. |        | Fairfax. |        | Isle of Wight. |        |
|--------------------|----------|--------|--------|--------|----------|--------|----------------|--------|
|                    | Lbs.     | Value. | Lbs.   | Value. | Lbs.     | Value. | Lbs.           | Value. |
| Alewives.....      |          |        | 3,600  | \$36   |          |        |                |        |
| Black bass.....    |          |        |        |        | 475      | \$24   |                |        |
| Carp.....          |          |        |        |        | 1,200    | 37     |                |        |
| Cat-fish.....      |          |        | 2,700  | 81     | 7,325    | 220    | 1,000          | \$50   |
| Croakers.....      | 9,000    | \$130  |        |        |          |        | 6,000          | 90     |
| Drum.....          | 200      | 2      |        |        |          |        |                |        |
| Eels.....          | 600      | 39     |        |        | 3,385    | 102    |                |        |
| Flounders.....     | 4,100    | 59     | 540    | 22     |          |        |                |        |
| Perch, white.....  | 5,700    | 157    | 450    | 22     | 7,750    | 388    | 2,300          | 77     |
| Perch, yellow..... |          |        | 900    | 27     | 9,650    | 241    |                |        |
| Pike.....          |          |        |        |        | 2,938    | 178    |                |        |
| Shad.....          | 300      | 12     | 2,700  | 90     |          |        |                |        |
| Squeteague.....    | 1,200    | 27     |        |        |          |        | 3,000          | 50     |
| Striped bass.....  | 1,600    | 98     | 1,800  | 126    | 1,500    | 75     | 4,500          | 255    |
| Suckers.....       |          |        | 475    | 10     | 8,350    | 167    |                |        |
| Sun-fish.....      |          |        |        |        | 1,050    | 32     |                |        |
| Total.....         | 22,700   | 524    | 13,165 | 414    | 43,623   | 1,464  | 16,800         | 522    |

| Species.           | King George. |        | King William. |        | Nansemond. |        |
|--------------------|--------------|--------|---------------|--------|------------|--------|
|                    | Lbs.         | Value. | Lbs.          | Value. | Lbs.       | Value. |
| Alewives.....      |              |        | 10,125        | \$150  |            |        |
| Cat-fish.....      | 1,450        | \$51   | 54,300        | 1,086  |            |        |
| Croakers.....      |              |        |               |        | 8,000      | \$320  |
| Eels.....          |              |        | 1,810         | 54     |            |        |
| Flounders.....     |              |        | 9,050         | 452    |            |        |
| Perch, white.....  | 875          | 53     | 9,050         | 362    |            |        |
| Perch, yellow..... | 1,250        | 63     |               |        |            |        |
| Pike.....          | 200          | 10     |               |        |            |        |
| Shad.....          |              |        | 5,430         | 181    | 5,200      | 150    |
| Squeteague.....    |              |        | 10,860        | 217    | 2,800      | 112    |
| Striped bass.....  | 725          | 43     | 18,100        | 1,810  |            |        |
| Suckers.....       |              |        | 9,131         | 183    |            |        |
| Total.....         | 4,500        | 220    | 127,856       | 4,495  | 16,000     | 582    |

| Species.           | Northampton. |        | Prince William. |        | York.  |        | Total.  |        |
|--------------------|--------------|--------|-----------------|--------|--------|--------|---------|--------|
|                    | Lbs.         | Value. | Lbs.            | Value. | Lbs.   | Value. | Lbs.    | Value. |
| Alewives.....      | 200          | \$2    |                 |        |        |        | 13,925  | \$188  |
| Black bass.....    |              |        |                 |        |        |        | 475     | 24     |
| Blue-fish.....     | 100          | 3      |                 |        |        |        | 100     | 3      |
| Carp.....          |              |        | 725             | \$22   |        |        | 1,925   | 59     |
| Cat-fish.....      |              |        | 9,250           | 278    |        |        | 76,025  | 1,766  |
| Croakers.....      | 600          | 6      |                 |        | 26,000 | \$390  | 49,600  | 936    |
| Drum.....          | 200          | 5      |                 |        |        |        | 400     | 7      |
| Eels.....          |              |        | 2,200           | 66     |        |        | 7,995   | 261    |
| Flounders.....     | 150          | 5      |                 |        | 21,000 | 840    | 34,840  | 1,378  |
| Hog-fish.....      | 100          | 10     |                 |        |        |        | 100     | 10     |
| Perch, white.....  |              |        | 6,675           | 334    |        |        | 32,800  | 1,393  |
| Perch, yellow..... |              |        | 4,950           | 124    |        |        | 16,750  | 455    |
| Pike.....          |              |        | 2,200           | 132    |        |        | 5,338   | 320    |
| Shad.....          | 200          | 10     |                 |        | 1,650  | 55     | 15,480  | 498    |
| Sheepshead.....    | 150          | 11     |                 |        |        |        | 150     | 11     |
| Spots.....         |              |        |                 |        | 1,800  | 72     | 1,800   | 72     |
| Squeteague.....    | 4,000        | 80     |                 |        | 29,000 | 580    | 50,860  | 1,066  |
| Striped bass.....  | 300          | 18     | 1,000           | 50     | 2,500  | 175    | 32,025  | 2,650  |
| Suckers.....       |              |        | 6,400           | 128    |        |        | 24,356  | 488    |
| Sun-fish.....      |              |        | 600             | 18     |        |        | 1,650   | 50     |
| Total.....         | 6,000        | 150    | 34,000          | 1,152  | 81,950 | 2,112  | 366,594 | 11,635 |

Table showing, by counties, the catch by lines in the shore fisheries of Virginia in 1897.

| Species.           | Accomac. |        | Elizabeth City. |         | Gloucester. |       | Isle of Wight. |       | King George. |       | King William. |       |
|--------------------|----------|--------|-----------------|---------|-------------|-------|----------------|-------|--------------|-------|---------------|-------|
|                    | Lbs.     | Val.   | Lbs.            | Val.    | Lbs.        | Val.  | Lbs.           | Val.  | Lbs.         | Val.  | Lbs.          | Val.  |
| Blue-fish .....    | 200      | \$10   | 54,000          | \$1,620 |             |       |                |       |              |       |               |       |
| Bonito .....       |          |        | 6,000           | 240     |             |       |                |       |              |       |               |       |
| Cat-fish .....     |          |        |                 |         |             |       | 7,000          | \$350 |              |       | 25,000        | \$500 |
| Cod .....          | 800      | 40     |                 |         |             |       |                |       |              |       |               |       |
| Croakers .....     | 131,500  | 2,175  | 485,000         | 2,425   |             |       | 24,000         | 320   |              |       |               |       |
| Drum .....         | 13,250   | 270    | 2,000           | 20      |             |       |                |       |              |       |               |       |
| Flounders .....    | 250      | 10     |                 |         |             |       |                |       |              |       |               |       |
| King-fish .....    | 10,510   | 332    |                 |         |             |       |                |       |              |       |               |       |
| Pompano .....      |          |        | 4,000           | 200     |             |       |                |       |              |       |               |       |
| Sea bass .....     | 665      | 10     |                 |         |             |       |                |       |              |       |               |       |
| Sheepshead .....   | 3,483    | 285    | 2,000           | 160     |             |       |                |       |              |       |               |       |
| Spots .....        | 700      | 46     | 120,000         | 2,400   |             |       |                |       |              |       |               |       |
| Squeteague .....   | 266,750  | 7,610  | 356,000         | 5,340   |             |       | 42,000         | 690   |              |       |               |       |
| Striped bass ..... |          |        | 3,000           | 120     |             |       |                |       |              |       | 1,000         | 100   |
| Whiting .....      | 1,500    | 45     |                 |         |             |       |                |       |              |       |               |       |
| Crabs, hard .....  | 25,000   | 125    | 727,032         | 2,423   | 88,000      | \$660 |                |       | 23,833       | \$286 | 78,500        | 393   |
| Total .....        | 454,608  | 10,958 | 1,759,032       | 14,948  | 88,000      | 660   | 73,000         | 1,360 | 23,833       | 286   | 104,500       | 993   |

| Species.          | Lancaster. |      | Mathews. |         | Nansemond. |       | Norfolk. |         | Northampton. |          | Northumberland. |       |
|-------------------|------------|------|----------|---------|------------|-------|----------|---------|--------------|----------|-----------------|-------|
|                   | Lbs.       | Val. | Lbs.     | Val.    | Lbs.       | Val.  | Lbs.     | Val.    | Lbs.         | Val.     | Lbs.            | Val.  |
| Blue-fish .....   |            |      |          |         |            |       |          |         | 742,500      | \$14,850 | 1,600           | \$64  |
| Croakers .....    |            |      |          |         |            |       |          |         | 56,925       | 1,139    | 3,300           | 32    |
| Flounders .....   |            |      |          |         |            |       |          |         |              |          | 1,300           | 42    |
| Hog-fish .....    |            |      |          |         |            |       |          |         |              |          | 1,000           | 20    |
| Sea bass .....    |            |      |          |         |            |       |          |         |              |          | 600             | 18    |
| Spots .....       |            |      |          |         |            |       |          |         |              |          | 3,200           | 80    |
| Squeteague .....  |            |      |          |         | 4,000      | \$160 |          |         | 3,375        | 68       | 5,300           | 212   |
| Crabs, hard ..... | 12,000     | \$88 | 435,000  | \$2,900 | 8,000      | 200   | 400,000  | \$2,500 | 1,730,000    | 8,000    | 132,000         | 990   |
| Total .....       | 12,000     | 88   | 435,000  | 2,900   | 12,000     | 360   | 400,000  | 2,500   | 2,532,800    | 24,057   | 148,300         | 1,458 |

| Species.           | Princess Anne. |       | Surry. |       | Warwick. |       | Westmoreland. |       | York.     |         | Total.    |          |
|--------------------|----------------|-------|--------|-------|----------|-------|---------------|-------|-----------|---------|-----------|----------|
|                    | Lbs.           | Val.  | Lbs.   | Val.  | Lbs.     | Val.  | Lbs.          | Val.  | Lbs.      | Val.    | Lbs.      | Val.     |
| Blue-fish .....    | 500            | \$15  |        |       |          |       |               |       |           |         | 798,800   | \$16,559 |
| Bonito .....       |                |       |        |       |          |       |               |       |           |         | 6,000     | 240      |
| Cat-fish .....     |                |       |        |       |          |       |               |       |           |         | 32,000    | 850      |
| Cod .....          |                |       |        |       |          |       |               |       |           |         | 800       | 40       |
| Croakers .....     | 17,500         | 175   | 5,000  | \$150 | 12,500   | \$125 |               |       | 211,200   | \$1,074 | 946,925   | 7,615    |
| Drum .....         |                |       |        |       |          |       |               |       |           |         | 15,250    | 290      |
| Flounders .....    |                |       |        |       | 2,000    | 50    |               |       |           |         | 3,550     | 102      |
| Hog-fish .....     |                |       |        |       |          |       |               |       |           |         | 1,000     | 20       |
| King-fish .....    |                |       |        |       |          |       |               |       |           |         | 10,510    | 332      |
| Perch, white ..... |                |       | 100    | 3     |          |       |               |       |           |         | 100       | 3        |
| Pompano .....      |                |       |        |       |          |       |               |       |           |         | 4,000     | 200      |
| Sea bass .....     |                |       |        |       |          |       |               |       |           |         | 1,265     | 28       |
| Sheepshead .....   |                |       |        |       |          |       |               |       |           |         | 5,483     | 445      |
| Spots .....        | 12,000         | 600   | 300    | 9     | 3,000    | 75    |               |       | 10,600    | 225     | 149,800   | 3,435    |
| Squeteague .....   | 10,000         | 100   | 6,000  | 180   | 20,000   | 200   |               |       | 103,200   | 1,596   | 816,625   | 16,156   |
| Striped bass ..... |                |       | 200    | 8     | 1,000    | 50    |               |       |           |         | 5,200     | 278      |
| Whiting .....      |                |       |        |       |          |       |               |       |           |         | 1,500     | 45       |
| Crabs, hard .....  | 705,000        | 4,500 |        |       |          |       | 48,533        | \$306 | 898,500   | 4,860   | 5,311,398 | 28,231   |
| Total .....        | 745,000        | 5,390 | 11,600 | 350   | 38,500   | 500   | 48,533        | 306   | 1,223,500 | 7,755   | 8,110,206 | 74,869   |

Table showing, by counties, the catch by dredges, tongs, and scrapes in Virginia for 1897.

| Counties.           | Oyster dredges.  |          |                |         | Oyster tongs.    |           |                |         | Total.     |           |
|---------------------|------------------|----------|----------------|---------|------------------|-----------|----------------|---------|------------|-----------|
|                     | Oysters, market. |          | Oysters, seed. |         | Oysters, market. |           | Oysters, seed. |         |            |           |
|                     | Lbs.             | Val.     | Lbs.           | Val.    | Lbs.             | Val.      | Lbs.           | Val.    | Lbs.       | Val.      |
| Vessel fisheries:   |                  |          |                |         |                  |           |                |         |            |           |
| Accomac.....        | 1,368,437        | \$75,386 |                |         | 764,610          | \$13,163  |                |         | 2,133,047  | \$88,549  |
| Elizabeth City..... | 588,000          | 30,240   | 315,000        | \$4,500 | 22,400           | 770       | 110,600        | \$1,814 | 1,036,000  | 37,324    |
| Gloucester.....     |                  |          |                |         | 662,900          | 27,990    | 1,236,550      | 18,015  | 1,899,450  | 46,005    |
| Isle of Wight.....  |                  |          |                |         | 280,700          | 9,530     | 343,000        | 4,900   | 623,700    | 14,430    |
| James City.....     |                  |          |                |         |                  |           | 70,000         | 1,000   | 70,000     | 1,000     |
| King George.....    |                  |          |                |         | 27,650           | 1,383     |                |         | 27,650     | 1,383     |
| King William.....   |                  |          |                |         | 82,250           | 4,400     | 381,500        | 5,460   | 463,750    | 9,850     |
| King and Queen..... |                  |          |                |         | 3,500            | 150       | 8,750          | 125     | 12,250     | 275       |
| Lancaster.....      | 40,600           | 1,990    |                |         | 55,300           | 2,690     |                |         | 95,900     | 4,680     |
| Mathews.....        |                  |          |                |         | 77,000           | 2,750     | 35,000         | 500     | 112,000    | 3,250     |
| Middlesex.....      |                  |          |                |         | 11,340           | 648       |                |         | 11,340     | 648       |
| Nansemond.....      |                  |          |                |         | 1,047,830        | 29,963    | 1,131,200      | 16,160  | 2,179,030  | 46,123    |
| Norfolk.....        | 84,000           | 3,600    |                |         | 2,769,445        | 109,662   | 135,800        | 2,380   | 2,989,245  | 115,642   |
| Northampton.....    | 32,200           | 1,690    |                |         | 277,200          | 9,316     |                |         | 309,400    | 11,006    |
| Northumberland..... | 623,455          | 36,743   |                |         |                  |           |                |         | 623,455    | 36,743    |
| Warwick.....        |                  |          |                |         | 422,100          | 12,065    | 35,000         | 500     | 457,100    | 12,565    |
| Westmoreland.....   | 221,550          | 12,980   |                |         |                  |           |                |         | 221,500    | 12,980    |
| Richmond.....       | 11,900           | 680      |                |         | 12,600           | 825       | 66,500         | 950     | 91,000     | 2,455     |
| York.....           |                  |          |                |         | 507,850          | 18,138    | 353,500        | 5,163   | 861,350    | 23,301    |
| Total.....          | 2,970,142        | 163,309  | 315,000        | 4,500   | 7,024,675        | 243,443   | 3,907,400      | 56,957  | 14,217,217 | 468,209   |
| Shore fisheries:    |                  |          |                |         |                  |           |                |         |            |           |
| Accomac.....        | 550,900          | 25,765   |                |         | 4,203,528        | 261,209   | 189,700        | 7,960   | 4,944,128  | 294,934   |
| Elizabeth City..... |                  |          |                |         | 1,382,500        | 68,670    | 875,000        | 12,500  | 2,257,500  | 81,170    |
| Essex.....          |                  |          |                |         | 580,650          | 40,775    |                |         | 580,650    | 40,775    |
| Gloucester.....     |                  |          |                |         | 763,175          | 38,621    | 572,250        | 8,175   | 1,335,425  | 46,796    |
| Isle of Wight.....  |                  |          |                |         | 471,100          | 9,345     |                |         | 471,100    | 9,345     |
| James City.....     |                  |          |                |         | 65,100           | 3,075     | 84,000         | 1,200   | 149,100    | 4,275     |
| King George.....    | 42,000           | 2,100    |                |         | 98,000           | 4,900     |                |         | 140,000    | 7,000     |
| King William.....   |                  |          |                |         | 14,000           | 1,300     |                |         | 14,000     | 1,300     |
| Lancaster.....      |                  |          |                |         | 4,323,900        | 204,730   |                |         | 4,323,900  | 204,730   |
| Mathews.....        |                  |          |                |         | 3,752,000        | 134,000   |                |         | 3,752,000  | 134,000   |
| Middlesex.....      |                  |          |                |         | 6,146,000        | 296,550   |                |         | 6,146,000  | 296,550   |
| Nansemond.....      |                  |          |                |         | 791,000          | 22,850    |                |         | 791,000    | 22,850    |
| Norfolk.....        |                  |          |                |         | 2,044,000        | 71,240    |                |         | 2,044,000  | 71,240    |
| Northampton.....    |                  |          |                |         | 1,106,266        | 77,978    |                |         | 1,106,266  | 77,978    |
| Northumberland..... | 556,850          | 29,723   |                |         | 865,900          | 46,225    |                |         | 1,422,750  | 75,948    |
| Princess Anne.....  |                  |          |                |         | 8,750            | 938       |                |         | 8,750      | 938       |
| Richmond.....       |                  |          |                |         | 963,200          | 68,600    |                |         | 963,200    | 68,600    |
| Warwick.....        |                  |          |                |         | 630,000          | 5,050     |                |         | 630,000    | 5,050     |
| Westmoreland.....   | 295,750          | 16,900   |                |         | 473,200          | 27,020    |                |         | 768,950    | 43,920    |
| York.....           |                  |          |                |         | 1,911,000        | 74,075    | 1,190,000      | 17,000  | 3,101,000  | 91,075    |
| Total.....          | 1,445,500        | 74,488   |                |         | 30,593,269       | 1,452,151 | 2,910,950      | 46,835  | 34,949,719 | 1,573,474 |
| Grand total         | 4,415,642        | 237,797  | 315,000        | 4,500   | 37,617,944       | 1,695,594 | 6,818,350      | 103,792 | 49,166,936 | 2,041,683 |

| Counties.                | Clam tongs and hoes. |               | Crab scrapes.  |               |
|--------------------------|----------------------|---------------|----------------|---------------|
|                          | Clams.               |               | Crabs, soft.   |               |
|                          | Lbs.                 | Value.        | Lbs.           | Value.        |
| <b>Vessel fisheries:</b> |                      |               |                |               |
| Accomac.....             | 112,048              | \$7,758       | .....          | .....         |
| Elizabeth City.....      | 400                  | 50            | .....          | .....         |
| Norfolk.....             | 8,000                | 300           | .....          | .....         |
| Northampton.....         | 18,560               | 1,440         | .....          | .....         |
| <b>Total.....</b>        | <b>139,008</b>       | <b>9,548</b>  | .....          | .....         |
| <b>Shore fisheries:</b>  |                      |               |                |               |
| Accomac.....             | 360,528              | 27,438        | 798,021        | \$28,646      |
| Elizabeth City.....      | 32,000               | 2,400         | .....          | .....         |
| Gloucester.....          | 57,040               | 4,414         | .....          | .....         |
| Mathews.....             | 47,600               | 3,400         | .....          | .....         |
| Northampton.....         | 76,400               | 7,350         | .....          | .....         |
| York.....                | 128,992              | 11,547        | .....          | .....         |
| <b>Total.....</b>        | <b>702,560</b>       | <b>56,549</b> | <b>798,021</b> | <b>28,646</b> |
| <b>Grand total</b>       | <b>841,568</b>       | <b>66,097</b> | <b>798,021</b> | <b>28,646</b> |



# 308 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties and species, the yield by slat traps, pots, and spears, and other minor apparatus in the shore fisheries of Virginia in 1897.

| Apparatus and counties. | Alewives. |       | Cat-fish. |         | Eels.  |       | Perch, white. |       | Shad.  |       | Suckers. |         |
|-------------------------|-----------|-------|-----------|---------|--------|-------|---------------|-------|--------|-------|----------|---------|
|                         | Lbs.      | Val.  | Lbs.      | Val.    | Lbs.   | Val.  | Lbs.          | Val.  | Lbs.   | Val.  | Lbs.     | Val.    |
| Slat traps:             |           |       |           |         |        |       |               |       |        |       |          |         |
| Henrico.....            | 120,000   | \$900 | 22,500    | \$1,012 | 22,500 | \$625 | 16,500        | \$990 | 21,875 | \$625 | 36,000   | \$1,440 |
| Nansemond.....          | 300       | 3     | 100       | 3       |        |       | 600           | 30    | 1,400  | 40    |          |         |
| Total.....              | 120,300   | 903   | 22,600    | 1,015   | 22,500 | 625   | 17,100        | 1,020 | 23,275 | 665   | 36,000   | 1,440   |
| Pots and spears:        |           |       |           |         |        |       |               |       |        |       |          |         |
| Accomac.....            |           |       |           |         | 6,565  | 178   |               |       |        |       |          |         |
| Essex.....              |           |       |           |         | 3,000  | 120   |               |       |        |       |          |         |
| Isle of Wight.....      |           |       |           |         | 6,000  | 180   |               |       |        |       |          |         |
| Northumberland.....     |           |       |           |         | 6,800  | 204   |               |       |        |       |          |         |
| Richmond.....           |           |       |           |         | 5,000  | 200   |               |       |        |       |          |         |
| Surry.....              |           |       |           |         | 4,000  | 120   |               |       |        |       |          |         |
| Total.....              |           |       |           |         | 31,365 | 1,002 |               |       |        |       |          |         |
| Other minor apparatus:  |           |       |           |         |        |       |               |       |        |       |          |         |
| Nansemond.....          | 4,000     | 40    |           |         |        |       |               |       | 24,000 | 800   |          |         |
| Grand total.            | 124,300   | 943   | 22,600    | 1,015   | 53,865 | 1,627 | 17,100        | 1,020 | 47,275 | 1,465 | 36,000   | 1,440   |

| Apparatus and counties. | Crabs, soft. |         | Terrapins. |         | Turtles. |        | Frogs. |        |
|-------------------------|--------------|---------|------------|---------|----------|--------|--------|--------|
|                         | Lbs.         | Value.  | Lbs.       | Value.  | Lbs.     | Value. | Lbs.   | Value. |
| Other minor apparatus:  |              |         |            |         |          |        |        |        |
| Accomac.....            | 90,562       | \$2,716 | 2,572      | \$1,434 | 700      | \$33   |        |        |
| Charles City.....       |              |         | 150        | 30      | 790      | 16     | 290    | \$23   |
| Chesterfield.....       |              |         | 1,500      | 90      |          |        |        |        |
| Dinwiddie.....          |              |         | 500        | 30      |          |        |        |        |
| Gloucester.....         |              |         | 1,100      | 400     |          |        |        |        |
| Lancaster.....          | 118,800      | 6,192   |            |         |          |        |        |        |
| New Kent.....           |              |         |            |         | 510      | 10     | 435    | 35     |
| Northampton.....        | 4,333        | 390     |            |         |          |        |        |        |
| Northumberland.....     | 56,400       | 1,970   |            |         |          |        | 300    | 50     |
| Prince George.....      |              |         | 6,000      | 120     | 1,200    | 24     |        |        |
| Total.....              | 270,095      | 11,268  | 11,822     | 2,104   | 3,200    | 83     | 1,025  | 108    |

## SUMMARY.

| Apparatus and counties. | Lbs.    | Value.  | Apparatus and counties. | Lbs.    | Value.  |
|-------------------------|---------|---------|-------------------------|---------|---------|
| Slat traps:             |         |         | Other minor apparatus:  |         |         |
| Henrico.....            | 239,375 | \$5,592 | Accomac.....            | 93,834  | \$4,183 |
| Nansemond.....          | 2,400   | 76      | Charles City.....       | 1,230   | 69      |
| Total.....              | 241,775 | 5,668   | Chesterfield.....       | 1,500   | 90      |
| Pots and spears:        |         |         | Dinwiddie.....          | 500     | 30      |
| Accomac.....            | 6,565   | 178     | Gloucester.....         | 1,100   | 400     |
| Essex.....              | 3,000   | 120     | Lancaster.....          | 118,800 | 6,192   |
| Isle of Wight.....      | 6,000   | 180     | Nansemond.....          | 28,000  | 840     |
| Northumberland.....     | 6,800   | 204     | New Kent.....           | 945     | 45      |
| Richmond.....           | 5,000   | 200     | Northampton.....        | 4,333   | 390     |
| Surry.....              | 4,000   | 120     | Northumberland.....     | 56,700  | 2,020   |
| Total.....              | 31,365  | 1,002   | Prince George.....      | 7,200   | 144     |
|                         |         |         | Total.....              | 314,142 | 14,403  |
|                         |         |         | Grand total.....        | 587,282 | 21,073  |

## THE MENHADEN INDUSTRY.

The menhaden industry of Virginia is in a prosperous condition, although there are not so many factories in operation now as formerly, there being 21 running in 1891, whereas in 1897 there were but 16. The value of the investment in the former year was \$665,790, against \$548,400 in the latter, while the number of men employed decreased from 1,229 to 1,170. The greatest decrease was in the number of seines

used, there being 60 in 1891 and only 37 in 1897. This is due principally to the gradual substitution of steamers for sail vessels, there being 63 sail vessels fishing and transporting in 1891 against 28 in 1897. Menhaden were fairly abundant, the catch numbering 263,203,000, but the fish were exceedingly dry, yielding only 177,043 gallons of oil; whereas the 191,365,500 fish caught in 1891 yielded 396,575 gallons. The quantity of scrap produced was 21,434 tons, worth \$331,227, in 1897, against 17,054 tons, worth \$230,647, in 1891. The following table shows in detail the extent of this industry in 1897:

*Table showing the extent of the menhaden industry of Virginia in 1897.*

| Items.                                   | No.         | Value.    | Items.                                   | No.   | Value.    |
|--|-------------|-----------|--|-------|-----------|
| Factories .....                          | 16          | \$181,700 | Steam vessels fishing .....              | 14    | \$148,000 |
| Cash capital .....                       |             | 115,500   | Tonnage .....                            | 1,061 |           |
| Wages paid factory employees .....       |             | 52,594    | Outfit .....                             |       | 34,227    |
| Persons in factories .....               | 552         |           | Sail vessels fishing .....               | 15    | 17,200    |
| Persons on vessels .....                 | 618         |           | Tonnage .....                            | 429   |           |
| Menhaden utilized .....                  | 263,203,000 | 243,497   | Outfit .....                             |       | 10,322    |
| Tons of dry scrap .....                  | 13,488      | 255,543   | Sail vessels transporting .....          | 13    | 13,400    |
| Tons of crude and acidulated scrap ..... | 7,946       | 75,684    | Tonnage .....                            | 372   |           |
| Gallons of oil made .....                | 177,043     | 30,805    | Outfit .....                             |       | 2,651     |
|  |             |           | Seines (total length, 30,622 feet) ..... | 37    | 25,400    |

#### THE WHOLESALE FISHERY TRADE.

In connection with the fisheries of Virginia there is a considerable wholesale trade in fishery products. In 1897 there were 56 establishments or firms in 21 different localities of the State in this branch of industry. The investment in shore property and cash capital utilized in the business was \$640,560, and the number of persons engaged was 3,079. The total value of the products handled was \$1,663,956.

*Table showing, by localities, the extent of the wholesale trade in fishery products of Virginia in 1897.*

| Items.                        | Lewisetta, Wheelton, Sandy Bottom, and Earnest. |          | West Point. |          | Hampton. |          | Suffolk. |         | Portsmouth. |          |
|-------------------------------|---|----------|-------------|----------|----------|----------|----------|---------|-------------|----------|
|                               | No.   | Val.     | No.         | Val.     | No.      | Val.     | No.      | Val.    | No.         | Val.     |
| Establishments .....          | 4   | \$25,950 | 4           | \$16,000 | 5        | \$35,460 | 2        | \$5,000 | 2           | \$28,000 |
| Cash capital .....            |   | 21,500   |             | 29,000   |          | 37,000   |          | 4,000   |             | 12,000   |
| Persons engaged .....         | 300   |          | 197         |          | 416      |          | 79       |         | 234         |          |
| <i>Products handled.</i>      |   |          |             |          |          |          |          |         |             |          |
| Oysters:                      |   |          |             |          |          |          |          |         |             |          |
| Opened .....                  | 56,000  | 47,600   | 170,500     | 161,725  | 96,635   | 82,139   | 31,000   | 34,800  | 126,550     | 101,240  |
| In shell .....                |   |          | 400         | 200      | 17,000   | 8,100    | 425      | 215     |             |          |
| Canned, 1-lb. cans. number .. | 480,000   | 30,000   |             |          |          |          |          |         |             |          |
| Canned, 2-lb. cans. do. ....  | 60,000  | 6,500    |             |          |          |          |          |         |             |          |
| Oyster shells .....           |   |          | 2,000       | 25       |          |          | 44,000   | 1,100   | 190,000     | 3,800    |
| Clams .....                   |   |          |             |          | 3,975    | 3,506    |          |         |             |          |
| Crabs:                        |   |          |             |          |          |          |          |         |             |          |
| Canned, 1-lb. cans. number .. |   |          |             |          | 94,512   | 14,177   |          |         |             |          |
| Canned, 2-lb. cans. do. ....  |   |          |             |          | 94,560   | 22,064   |          |         |             |          |
| Crab meat .....               | 1,280   | 896      |             |          |          |          |          |         | 10,000      | 7,200    |
| Crab refuse .....             | 11  | 121      |             |          | 105      | 1,155    |          |         |             |          |
| Fish, fresh .....             |   |          |             |          | 66,000   | 1,970    |          |         |             |          |
| Value of products .....       |   | 85,117   |             | 161,950  |          | 133,111  |          | 36,115  |             | 112,240  |

# 310 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by localities, the extent of the wholesale trade in fishery products of Virginia in 1897—Continued.

| Items.                          | Norfolk.  |           | Cape Charles and Brighton. |         | Willis Wharf. |         | Chesconessex, Leemont, Hopkins, Mapps-ville, and Dreka. |         |
|---------------------------------|-----------|-----------|----------------------------|---------|---------------|---------|---|---------|
|                                 | No.       | Value.    | No.                        | Value.  | No.           | Value.  | No.   | Value.  |
| Establishments .....            | 16        | \$195,000 | 3                          | \$8,000 | 2             | \$3,000 | 5   | \$5,500 |
| Cash capital .....              |           | 147,000   |                            | 12,000  |               | 3,000   |   | 18,700  |
| Persons engaged .....           | 1,552     |           | 50                         |         | 52            |         | 55  |         |
| <i>Products handled.</i>        |           |           |                            |         |               |         |   |         |
| Oysters:                        |           |           |                            |         |               |         |   |         |
| Opened.....gallons..            | 961,000   | 768,800   |                            |         | 20,000        | 12,995  | 15,475  | 11,666  |
| In shell.....bushels..          | 51,600    | 20,640    | 2,500                      | 2,625   |               |         | 15,000  | 12,600  |
| Canned, 1-lb. cans. number..    | 115,200   | 6,720     |                            |         |               |         |   |         |
| Canned, 2-lb. cans. do.....     | 21,600    | 2,304     |                            |         |               |         |   |         |
| Oyster shells.....bushels..     | 1,017,000 | 13,720    |                            |         |               |         |   |         |
| Clams.....do.....               | 5,700     | 2,850     | 5,000                      | 6,275   | 2,000         | 1,600   | 3,500   | 3,250   |
| Clams:                          |           |           |                            |         |               |         |   |         |
| Canned, 1-lb. cans. number..    |           |           | 72,000                     | 6,000   |               |         |   |         |
| Canned, 2-lb. cans. do.....     |           |           | 6,000                      | 900     |               |         |   |         |
| Clam juice, 2-lb. cans. do..... |           |           | 4,800                      | 300     |               |         |   |         |
| Crabs:                          |           |           |                            |         |               |         |   |         |
| Hard.....do.....                | 225,000   | 900       | 2,952,000                  | 7,995   |               |         | 33,200  | 249     |
| Soft.....do.....                |           |           | 13,000                     | 390     |               |         | 932,510   | 27,198  |
| Crab meat.....gallons..         | 36,500    | 26,550    | 5,400                      | 3,200   |               |         |   |         |
| Terrapin.....pounds..           | 3,000     | 60        |                            |         | 525           | 250     | 1,260   | 1,040   |
| Turtles.....do.....             | 5,000     | 500       |                            |         |               |         |   |         |
| Fish, fresh.....do.....         | 2,720,700 | 96,765    | 735,170                    | 7,528   |               |         | 66,000  | 2,380   |
| Caviar.....do.....              | 8,400     | 2,400     |                            |         |               |         | 300   | 120     |
| Value of products.....          |           | 942,209   |                            | 35,213  |               | 14,845  |   | 58,503  |

| Items.                          | Watchapreague and Wisharts Point. |         | Franklin City. |         | Chincoteague. |         | Total.    |           |
|---------------------------------|-----------------------------------|---------|----------------|---------|---------------|---------|-----------|-----------|
|                                 | No.                               | Value.  | No.            | Value.  | No.           | Value.  | No.       | Value.    |
| Establishments .....            | 2                                 | \$1,050 | 5              | \$2,700 | 6             | \$5,900 | 56        | \$331,560 |
| Cash capital .....              |                                   | 4,500   |                | 10,500  |               | 9,800   |           | 309,000   |
| Persons engaged .....           | 40                                |         | 41             |         | 63            |         | 3,079     |           |
| <i>Products handled.</i>        |                                   |         |                |         |               |         |           |           |
| Oysters:                        |                                   |         |                |         |               |         |           |           |
| Opened.....gallons..            | 16,500                            | 11,200  | 13,575         | 9,355   | 6,700         | 4,566   | 1,513,935 | 1,246,086 |
| In shell.....bushels..          | 625                               | 550     | 20,210         | 16,918  | 19,825        | 16,652  | 127,585   | 78,500    |
| Canned, 1-lb. cans. number..    |                                   |         |                |         |               |         | 595,200   | 36,720    |
| Canned, 2-lb. cans. do.....     |                                   |         |                |         |               |         | 81,600    | 8,804     |
| Oyster shells.....bushels..     |                                   |         |                |         |               |         | 1,253,000 | 18,645    |
| Clams.....do.....               | 750                               | 750     | 13,925         | 11,790  | 15,211        | 12,372  | 50,061    | 42,398    |
| Clams:                          |                                   |         |                |         |               |         |           |           |
| Canned, 1-lb. cans. number..    |                                   |         |                |         |               |         | 72,000    | 6,000     |
| Canned, 2-lb. cans. do.....     |                                   |         |                |         |               |         | 6,000     | 900       |
| Clam juice, 2-lb. cans. do..... |                                   |         |                |         |               |         | 4,800     | 300       |
| Crabs:                          |                                   |         |                |         |               |         |           |           |
| Hard.....do.....                |                                   |         |                |         |               |         | 3,210,200 | 9,144     |
| Soft.....do.....                |                                   |         |                |         |               |         | 945,510   | 27,588    |
| Canned, 1-lb. cans. do.....     |                                   |         |                |         |               |         | 94,512    | 14,177    |
| Canned, 2-lb. cans. do.....     |                                   |         |                |         |               |         | 94,560    | 22,064    |
| Crab meat.....gallons..         |                                   |         |                |         |               |         | 58,180    | 87,846    |
| Crab refuse.....tons..          |                                   |         |                |         |               |         | 116       | 1,276     |
| Terrapin.....pounds..           |                                   |         |                |         |               |         | 4,785     | 1,350     |
| Turtles.....do.....             |                                   |         |                |         |               |         | 5,000     | 500       |
| Fish, fresh.....do.....         |                                   |         |                |         | 25,000        | 500     | 3,612,870 | 109,143   |
| Caviar.....do.....              |                                   |         |                |         |               |         | 8,700     | 2,520     |
| Value of products.....          |                                   | 12,500  |                | 38,063  |               | 34,090  |           | 1,663,966 |

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# STATISTICS

OF THE

## FISHERIES OF THE NEW ENGLAND STATES.

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PREPARED IN THE DIVISION OF STATISTICS AND METHODS OF THE  
FISHERIES, UNITED STATES FISH COMMISSION.

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C. H. TOWNSEND, ASSISTANT IN CHARGE.

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## INTRODUCTORY NOTE.

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The report on the fisheries of the New England States presented herewith relates to the condition of the commercial fisheries in the year 1898, and is based on inquiries made in the field in 1899 by statistical agents of the U. S. Fish Commission.

The results of the investigation have already been published in condensed form as Statistical Bulletin No. 15, and in the report of the Commissioner for 1900.

The report has been prepared under the direction of Mr. C. H. Townsend, assistant in charge of the division of fisheries.

The agents of the division engaged in the investigations in the field were Messrs. C. H. Stevenson in Connecticut, W. A. Wilcox and T. M. Cogswell in Massachusetts and New Hampshire, Ansley Hall in Massachusetts, E. S. King in Rhode Island, and J. N. Cobb in Maine.

The assistant in charge visited some of the more important fisheries of the region, and Mr. J. B. Wilson was temporarily engaged in Massachusetts.

GEO. M. BOWERS,  
*Commissioner.*





# STATISTICS OF THE FISHERIES OF THE NEW ENGLAND STATES.

## GENERAL NOTES AND STATISTICS.

The New England States having coast fisheries are Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut. The number of persons engaged in the fisheries of these States in 1898 was 35,631. Of this number 22,367 were fishermen and 13,264 were shoresmen employed in the various shore industries directly connected with the fisheries. Maine and Massachusetts maintain extensive fisheries, but the industry is considerably smaller in the other three States. Maine employed in its fisheries 16,954 persons, Massachusetts 14,363, New Hampshire only 154, Rhode Island 1,687, and Connecticut 2,473. Since the last general canvass of these States in 1889 there has been a decrease of 905 in the number of persons employed. In Maine there was an increase of 2,825 persons, while a decrease occurred in all of the other States, the largest number being 2,875 in Massachusetts, and the largest percentage, 57.80 per cent, in New Hampshire.

The amount of capital invested in the fisheries was \$19,637,036. The investment in Maine was \$4,013,053; in New Hampshire, \$52,648; in Massachusetts, \$13,372,902; in Rhode Island, \$957,142; and in Connecticut, \$1,241,291. As compared with 1889 the capital invested has decreased \$457,758. There has been an increase in Maine of \$1,123,160 and in Massachusetts of \$127,673. In New Hampshire there was a decrease of \$60,012, in Rhode Island of \$63,036, and in Connecticut of \$1,585,543. The decrease in Connecticut is due chiefly to the fact that the value of the oyster-grounds, included in 1889, was omitted in 1898, the actual decrease in the investment being about \$282,818.

The number of fishing and transporting vessels employed in the fisheries was 1,427, having a net tonnage of 43,821 tons, and a value of \$2,920,825. The value of their outfits was \$1,303,514. There has been a slight decrease since 1889 in the number of vessels and a large decrease in the tonnage. The vessels have increased in number in Maine, Massachusetts, and Rhode Island, but have decreased in the other States. The decrease in the total tonnage is due chiefly to many of the larger fishing vessels being sold for use in the coasting trade, and their places in the fisheries being supplied by smaller ones; and also to the transfer of a number of menhaden vessels from the New England region to the State of New York. The number of boats employed in the shore fisheries was 10,557, valued at \$621,670; the apparatus of capture used on vessels and boats was valued at \$1,218,898; the value of shore and

accessory property in the fisheries and fishery industries was \$7,115,030, and the cash capital amounted to \$6,457,099.

The products of the fisheries aggregated 393,457,906 pounds, valued at \$9,682,290. Maine produced 123,404,561 pounds, valued at \$2,654,919; New Hampshire, 3,020,715 pounds, valued at \$48,987; Massachusetts, 202,257,817 pounds, valued at \$4,463,727; Rhode Island, 32,854,396 pounds, valued at \$955,058; and Connecticut, 31,920,417 pounds, valued at \$1,559,599. Some of the more important species secured in the fisheries of these States were cod, cusk, haddock, hake, and pollock, valued at \$2,798,109, halibut at \$569,515, mackerel at \$481,933, herring at \$596,684, alewives at \$76,959, smelt at \$140,912, blue-fish at \$86,461, scup at \$93,353, squeteague at \$108,945, sword-fish at \$90,130, shad at \$44,018, eels at \$64,756, lobsters at \$1,276,967, clams and quahogs at \$578,455, and oysters at \$1,910,684. The products of the whale fisheries, consisting chiefly of whale, sperm, and sea-elephant oils, and whalebone, were valued at \$285,688.

There has been a decrease in the products of the fisheries since 1889 of 259,712,134 pounds, or 39.76 per cent, in quantity, and of \$868,351, or 8.23 per cent, in value. A decrease in quantity has occurred in all of the States in this section, varying from 4.75 per cent in Maine to 74.20 per cent in Rhode Island. The value in New Hampshire has also decreased \$39,524, or 44.65 per cent, and in Massachusetts \$1,394,547, or 23.80 per cent, but in Maine it has increased \$543,713, or 25.75 per cent, and to a small extent in Rhode Island and Connecticut.

The decrease in products in the various States, except in New Hampshire, where it relates to nearly all of the principal species, is due chiefly to a smaller quantity of algæ and to a decline in the catch of menhaden. The products of Maine in 1889 included 12,900,000 pounds of algæ, valued at \$6,315, whereas none appears in the statistics of that State in 1898. The products of Massachusetts included 117,993,900 pounds of algæ in 1889, valued at \$66,034, and only 700,000 pounds, valued at \$22,375, in 1898. If the algæ were eliminated from the statistics of these States in both years the result in Maine would be an increase in the more important products of 6,744,697 pounds in quantity and of \$550,028 in value, and in Massachusetts an increase of 20,334,048 pounds in quantity and a decrease of \$1,350,888 in value. The increase in the value of the products in Maine may be attributed principally to the high prices received for lobsters, but in Massachusetts the catch of lobsters was not large enough to materially offset the decrease in the value of products occasioned by the comparatively low prices received for fish. In Rhode Island the products have decreased in quantity, owing to a reduction of 109,440,000 pounds in the catch of menhaden. There has, however, been considerable increase in that State in the quantity of food species. The decrease in the products of Connecticut may be accounted for by the absence of

algæ, of which 18,000,000 pounds were included in 1889, and also by a falling off in the catch of cod, menhaden, and various other species.

The following publications of the United States Fish Commission may be consulted in studying the statistics of the fisheries of the New England States:

- The Fishery Industries of the United States. Section II. Geographical Review of the Fisheries for 1880. Parts I to V.
- The Fishery Industries of the United States. Section V. History and Methods of the Fisheries.
- Report on the Fisheries of the New England States, by J. W. Collins and Hugh M. Smith. Bull. U. S. Fish Com. 1890, pp. 73-176.
- Report on the Condition of the Sea Fisheries of the South Coast of New England in 1871 and 1872, by Spencer F. Baird. Rept. U. S. Fish Com. 1871-72, pp. I-XLI.
- The Sea Fisheries of Eastern North America, by Spencer F. Baird. Rept. U. S. Fish Com. 1886, pp. 3-224.
- Statistical Review of the Coast Fisheries of the United States, by J. W. Collins. Rept. U. S. Fish Com. 1888, pp. 271-378.
- The Herring Industry of the Passamaquoddy Region, Maine, by Ansley Hall. Rept. U. S. Fish Com. 1896, pp. 443-489.
- Notes on the Oyster Fishery of Connecticut, by J. W. Collins. Bull. U. S. Fish Com. 1889, pp. 461-497.
- The Lobster Fishery of Maine, by John N. Cobb. Bull. U. S. Fish Com. 1899, pp. 241-265.

The three tables which follow show in detail the number of persons employed, the amount of capital invested, and the quantity and value of the products of the fisheries of the New England States in 1898, and the table on page 321 presents a comparison of the extent of the fisheries in the years 1889 and 1898:

*Table showing the number of persons engaged in the fisheries of the New England States in 1898.*

| States.             | Fishermen. | Shoresmen. | Total. |
|---------------------|------------|------------|--------|
| Maine .....         | 8,717      | 8,237      | 16,954 |
| New Hampshire ..... | 143        | 11         | 154    |
| Massachusetts ..... | 10,341     | 4,022      | 14,363 |
| Rhode Island .....  | 1,340      | 347        | 1,687  |
| Connecticut .....   | 1,826      | 647        | 2,473  |
| Total .....         | 22,367     | 13,264     | 35,631 |

# 318 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing the investment in the fisheries of the New England States in 1898.

| Items.                                      | Maine.  |           | New Hampshire. |         | Massachusetts. |             |
|---|---------|-----------|----------------|---------|----------------|-------------|
|   | No.     | Value.    | No.            | Value.  | No.            | Value.      |
| Vessels.....                                | 497     | \$538,400 | 5              | \$3,900 | 687            | \$1,776,025 |
| Tonnage.....                                | 8,175   |           | 79             |         | 30,558         |             |
| Outfit.....                                 |         | 182,427   |                | 3,458   |                | 939,772     |
| Boats.....                                  | 5,741   | 284,897   | 123            | 5,396   | 2,625          | 178,082     |
| Seines.....                                 | 251     | 29,660    | 1              | 500     | 272            | 88,382      |
| Bag nets.....                               | 202     | 8,645     |                |         |                |             |
| Dip nets.....                               | 182     | 637       |                |         | 213            | 272         |
| Drag nets.....                              |         |           |                |         | 27             | 1,610       |
| Fyke nets.....                              | 26      | 710       |                |         | 88             | 1,124       |
| Gill nets.....                              | 3,722   | 37,413    | 60             | 844     | 4,632          | 50,312      |
| Pound nets.....                             | 67      | 14,680    | 17             | 6,960   | 126            | 141,835     |
| Snap nets.....                              | 20      | 20        |                |         |                |             |
| Trap nets.....                              | 33      | 14,125    |                |         | 4              | 990         |
| Weirs.....                                  | 557     | 111,618   |                |         |                |             |
| Lines, hand and trawl.....                  |         | 51,965    |                | 2,118   |                | 221,365     |
| Pots, eel.....                              | 333     | 188       |                |         | 1,290          | 2,376       |
| Pots, lobster.....                          | 155,978 | 155,777   | 1,675          | 1,666   | 26,254         | 31,481      |
| Harpoons.....                               |         | 1,155     |                |         |                | 1,200       |
| Spears.....                                 | 145     | 127       |                |         |                |             |
| Dredges, tongs, rakes, hoes, and forks..... |         | 2,032     |                | 32      |                | 15,199      |
| Other apparatus.....                        |         |           |                |         |                | 469         |
| Shore and accessory property.....           |         | 1,193,478 |                | 12,775  |                | 5,125,248   |
| Cash capital.....                           |         | 1,385,099 |                | 15,000  |                | 4,797,250   |
| Total.....                                  |         | 4,013,053 |                | 52,648  |                | 13,372,902  |

| Items.                                      | Rhode Island. |           | Connecticut. |           | Total.  |             |
|---|---------------|-----------|--------------|-----------|---------|-------------|
|   | No.           | Value.    | No.          | Value.    | No.     | Value.      |
| Vessels.....                                | 93            | \$167,850 | 195          | \$434,650 | 1,427   | \$2,920,825 |
| Tonnage.....                                | 1,454         |           | 3,555        |           | 43,821  |             |
| Outfit.....                                 |               | 46,597    |              | 131,260   |         | 1,303,514   |
| Boats.....                                  | 854           | 72,381    | 1,214        | 80,915    | 10,557  | 621,670     |
| Seines.....                                 | 49            | 7,243     | 67           | 6,355     | 640     | 132,140     |
| Bag nets.....                               |               |           |              |           | 202     | 8,645       |
| Dip nets.....                               |               |           |              |           | 396     | 909         |
| Drag nets.....                              |               |           |              |           | 27      | 1,610       |
| Fyke nets.....                              | 329           | 2,462     | 410          | 3,522     | 858     | 7,818       |
| Gill nets.....                              | 134           | 7,085     | 89           | 5,025     | 8,637   | 100,679     |
| Pound nets.....                             | 202           | 110,395   | 66           | 19,980    | 478     | 298,800     |
| Snap nets.....                              | 4             | 20        |              |           | 24      | 40          |
| Trap nets.....                              |               |           |              |           | 37      | 15,025      |
| Weirs.....                                  |               |           |              |           | 557     | 111,618     |
| Lines, hand and trawl.....                  |               | 2,010     |              | 1,357     |         | 278,815     |
| Pots, eel.....                              | 3,139         | 1,987     | 1,313        | 1,197     | 6,075   | 5,748       |
| Pots, lobster.....                          | 10,312        | 12,716    | 10,830       | 17,405    | 205,049 | 219,045     |
| Harpoons.....                               |               | 109       |              | 177       |         | 2,641       |
| Spears.....                                 | 29            | 46        | 56           | 37        | 230     | 210         |
| Dredges, tongs, rakes, hoes, and forks..... |               | 6,549     |              | 15,131    |         | 38,943      |
| Other apparatus.....                        |               | 43        |              | 700       |         | 1,212       |
| Shore and accessory property.....           |               | 439,149   |              | 344,380   |         | 7,115,090   |
| Cash capital.....                           |               | 80,500    |              | 179,250   |         | 6,457,099   |
| Total.....                                  |               | 957,142   |              | 1,241,291 |         | 19,637,086  |

Table showing the quantity and value of products taken in the fisheries of the New England States in 1898.

| Species.                | Maine.      |           | New Hampshire. |        | Massachusetts. |           |
|-------------------------|-------------|-----------|----------------|--------|----------------|-----------|
|                         | Lbs.        | Value.    | Lbs.           | Value. | Lbs.           | Value.    |
| Albacore                |             |           |                |        | 36,090         | \$912     |
| Alewives, fresh         | 925,325     | \$8,016   | 25,000         | \$250  | 1,877,061      | 22,268    |
| Alewives, salted        | 986,600     | 8,437     | 200,000        | 2,500  | 586,700        | 6,790     |
| Alewives, smoked        | 606,800     | 8,849     |                |        | 71,440         | 2,230     |
| Blue-fish               |             |           |                |        | 832,849        | 38,089    |
| Bonito                  |             |           |                |        | 89,136         | 2,410     |
| Butter-fish             | 14,800      | 740       |                |        | 30,620         | 818       |
| Cat-fish                | 4,000       | 40        |                |        | 5,200          | 110       |
| Cod, fresh              | 10,091,088  | 167,231   | 689,150        | 10,756 | 40,632,151     | 688,721   |
| Cod, salted             | 5,232,622   | 147,024   | 2,900          | 70     | 30,682,827     | 718,318   |
| Cunners                 | 148,300     | 1,025     |                |        | 85,350         | 5,250     |
| Cusk, fresh             | 1,138,201   | 12,545    | 97,500         | 995    | 5,825,173      | 61,308    |
| Cusk, salted            | 86,667      | 1,210     |                |        | 128,863        | 2,206     |
| Eels, fresh             | 160,611     | 12,622    |                |        | 425,846        | 17,635    |
| Eels, salted            | 3,200       | 320       |                |        |                |           |
| Flounders and flat-fish | 786,697     | 17,539    |                |        | 1,168,876      | 14,793    |
| Haddock, fresh          | 7,274,909   | 119,982   | 1,379,750      | 14,552 | 35,451,284     | 418,526   |
| Haddock, salted         | 956,657     | 12,369    | 4,000          | 100    | 130,230        | 1,292     |
| Hake, fresh             | 13,329,899  | 110,558   | 115,400        | 1,379  | 21,099,428     | 161,495   |
| Hake, salted            | 2,405,578   | 23,886    | 1,500          | 38     | 232,388        | 2,139     |
| Halibut, fresh          | 304,890     | 22,075    |                |        | 8,663,443      | 487,714   |
| Halibut, salted         |             |           |                |        | 1,859,854      | 59,726    |
| Herring, fresh          | 37,017,814  | 174,313   | 65,000         | 650    | 16,562,338     | 256,335   |
| Herring, salted         | 1,400,650   | 26,159    |                |        | 5,801,159      | 76,212    |
| Herring, smoked         | 3,738,500   | 63,005    |                |        |                |           |
| Hickory shad            |             |           |                |        | 1,000          | 15        |
| King-fish               |             |           |                |        | 245            | 22        |
| Mackerel, fresh         | 1,441,157   | 85,344    | 58,750         | 3,207  | 3,791,233      | 197,339   |
| Mackerel, salted        | 163,000     | 12,761    |                |        | 2,912,131      | 164,525   |
| Menhaden, fresh         | 6,780,000   | 17,105    |                |        | 1,497,367      | 10,544    |
| Menhaden, salted        | 539,900     | 3,601     |                |        |                |           |
| Perch                   |             |           | 1,650          | 165    | 57,523         | 3,662     |
| Pollock, fresh          | 1,126,746   | 8,463     | 180,200        | 1,559  | 6,566,388      | 38,256    |
| Pollock, salted         | 1,002,704   | 10,901    | 1,200          | 24     | 517,649        | 4,789     |
| Pompano                 |             |           |                |        | 150            | 15        |
| Salmon                  | 53,322      | 10,009    |                |        | 60             | 30        |
| Scup                    |             |           |                |        | 1,043,625      | 14,253    |
| Sea bass                |             |           |                |        | 99,300         | 4,946     |
| Shad, fresh             | 701,879     | 14,006    |                |        | 29,333         | 1,426     |
| Shad, salted            | 160,000     | 5,746     |                |        |                |           |
| Smelt                   | 1,608,045   | 139,345   |                |        | 7,079          | 515       |
| Spanish mackerel        |             |           |                |        | 210            | 30        |
| Squeteague              |             |           |                |        | 1,371,910      | 39,518    |
| Striped bass            | 25,067      | 4,206     | 850            | 85     | 12,948         | 939       |
| Sturgeon                | 12,075      | 367       |                |        | 8,490          | 402       |
| Suckers                 | 200         | 1         |                |        |                |           |
| Sword-fish, fresh       | 878,290     | 44,395    |                |        | 569,916        | 34,465    |
| Sword-fish, salted      |             |           |                |        | 27,270         | 815       |
| Tautog                  |             |           |                |        | 289,505        | 7,567     |
| Tomcod                  | 310,083     | 6,158     |                |        |                |           |
| Whiting                 |             |           |                |        | 37,200         | 492       |
| Refuse fish             | 55,000      | 354       |                |        |                |           |
| Squid, fresh            |             |           |                |        | 1,064,425      | 14,570    |
| Squid, salted           |             |           |                |        | 5,000          | 50        |
| Lobsters                | 11,183,294  | 992,855   | 108,515        | 9,372  | 1,693,741      | 147,702   |
| Shrimp                  |             |           |                |        | 25,200         | 1,183     |
| Quahogs or hard clams   |             |           |                |        | 510,536        | 50,724    |
| Clams (soft), fresh     | 8,758,800   | 274,885   | 6,000          | 360    | 1,470,951      | 102,594   |
| Clams (soft), salted    | 711,200     | 48,568    |                |        |                |           |
| Mussels                 |             |           |                |        | 7,400          | 130       |
| Oysters                 |             |           |                |        | 708,575        | 156,235   |
| Scallops                | 166,509     | 14,522    |                |        | 875,512        | 94,971    |
| Winkles                 |             |           |                |        | 9,500          | 475       |
| Irish moss              |             |           | 70,000         | 2,450  | 700,000        | 22,375    |
| Caviar                  | 845         | 454       |                |        |                |           |
| Sounds and tongues      | 281,917     | 12,840    |                |        | 67,562         | 2,803     |
| Haddock spawn           |             |           |                |        | 700            | 18        |
| Halibut fins            |             |           |                |        | 21,900         | 384       |
| Livers                  | 672,800     | 5,497     |                |        |                |           |
| Oil, fish               | 157,920     | 4,591     | 14,250         | 475    | 358,927        | 13,963    |
| Oil, sea-elephant       |             |           |                |        | 472,500        | 20,790    |
| Oil, whale              |             |           |                |        | 3,119,450      | 199,023   |
| Whalebone               |             |           |                |        | 27,100         | 65,875    |
| Total                   | 123,404,561 | 2,654,919 | 3,020,715      | 48,987 | 202,257,817    | 4,463,727 |



*Products taken in the fisheries of the New England States in 1898—Continued.*

| Species.                | Rhode Island. |         | Connecticut. |           | Total.      |           |
|-------------------------|---------------|---------|--------------|-----------|-------------|-----------|
|                         | Lbs.          | Value.  | Lbs.         | Value.    | Lbs.        | Value.    |
| Albacore                |               |         |              |           | 36,090      | \$912     |
| Alewives, fresh         | 628,132       | \$6,621 | 868,400      | \$7,346   | 4,323,918   | 44,501    |
| Alewives, salted        | 74,100        | 940     |              |           | 1,847,400   | 18,667    |
| Alewives, smoked        | 136,390       | 2,712   |              |           | 814,630     | 13,791    |
| Blue-fish               | 330,290       | 15,521  | 963,285      | 32,851    | 2,126,424   | 86,461    |
| Bonito                  | 124,450       | 2,615   |              |           | 213,586     | 5,025     |
| Bullheads               | 300           | 24      | 3,032        | 114       | 3,332       | 138       |
| Butter-fish             | 207,000       | 5,615   | 60,280       | 2,370     | 312,700     | 9,543     |
| Carp                    |               |         | 910          | 46        | 910         | 46        |
| Cat-fish                |               |         |              |           | 9,200       | 150       |
| Cod, fresh              | 1,111,811     | 23,556  | 451,225      | 10,978    | 52,975,425  | 901,242   |
| Cod, salted             | 315,101       | 13,154  |              |           | 36,232,550  | 878,566   |
| Cunners                 | 3,300         | 100     |              |           | 236,950     | 6,375     |
| Cusk, fresh             |               |         |              |           | 7,060,874   | 74,848    |
| Cusk, salted            |               |         |              |           | 215,530     | 3,416     |
| Eels, fresh             | 443,374       | 20,030  | 206,970      | 14,149    | 1,236,801   | 64,436    |
| Eels, salted            |               |         |              |           | 3,200       | 320       |
| Flounders and flat-fish | 1,710,057     | 27,576  | 443,864      | 13,383    | 4,109,494   | 73,291    |
| Haddock, fresh          | 366,525       | 8,373   | 112,800      | 856       | 44,585,268  | 562,289   |
| Haddock, salted         |               |         |              |           | 1,090,887   | 13,761    |
| Hake, fresh             |               |         |              |           | 34,544,727  | 273,432   |
| Hake, salted            |               |         |              |           | 2,639,466   | 26,063    |
| Halibut, fresh          |               |         |              |           | 8,968,333   | 509,789   |
| Halibut, salted         |               |         |              |           | 1,859,854   | 59,726    |
| Herring, fresh          | 2,000         | 10      |              |           | 53,647,152  | 431,308   |
| Herring, salted         |               |         |              |           | 7,201,809   | 102,371   |
| Herring, smoked         |               |         |              |           | 3,738,500   | 63,005    |
| Hickory shad            | 13,000        | 328     |              |           | 14,000      | 343       |
| King-fish               | 1,970         | 128     |              |           | 2,215       | 150       |
| Mackerel, fresh         | 359,900       | 15,004  | 40,913       | 1,753     | 5,691,953   | 302,647   |
| Mackerel, salted        |               |         | 28,000       | 2,000     | 3,103,131   | 179,286   |
| Menhaden, fresh         | 3,140,000     | 7,591   | 11,182,910   | 26,334    | 22,600,277  | 61,574    |
| Menhaden, salted        |               |         |              |           | 539,900     | 3,601     |
| Minnows                 | 3,728         | 356     |              |           | 3,728       | 356       |
| Perch                   | 48,475        | 1,920   | 15,572       | 760       | 123,220     | 6,507     |
| Pickarel                | 200           | 20      | 5,420        | 271       | 5,620       | 291       |
| Pollock, fresh          | 50,000        | 500     |              |           | 7,923,334   | 48,778    |
| Pollock, salted         |               |         |              |           | 1,521,553   | 15,714    |
| Pompano                 |               |         |              |           | 150         | 15        |
| Salmon                  |               |         |              |           | 53,382      | 10,039    |
| Scup                    | 6,390,225     | 75,596  | 101,040      | 3,504     | 7,534,890   | 93,353    |
| Sea bass                | 440,950       | 11,935  | 247,789      | 12,182    | 788,039     | 29,068    |
| Shad, fresh             | 25,112        | 1,625   | 499,325      | 21,215    | 1,255,649   | 38,272    |
| Shad, salted            |               |         |              |           | 160,000     | 5,746     |
| Smelt                   | 4,100         | 215     | 5,600        | 837       | 1,624,824   | 140,912   |
| Spanish mackerel        | 700           | 104     | 66           | 12        | 976         | 146       |
| Squeteague              | 3,125,635     | 63,976  | 193,643      | 5,451     | 4,691,188   | 108,945   |
| Striped bass            | 101,950       | 10,511  | 13,845       | 1,662     | 154,660     | 17,403    |
| Sturgeon                |               |         | 700          | 33        | 21,265      | 802       |
| Suckers                 |               |         | 53,373       | 2,068     | 53,573      | 2,069     |
| Sword-fish, fresh       | 55,875        | 2,935   | 85,980       | 7,520     | 1,590,061   | 89,315    |
| Sword-fish, salted      |               |         |              |           | 27,270      | 815       |
| Tautog                  | 248,129       | 7,214   | 70,540       | 3,118     | 608,174     | 17,899    |
| Tomcod                  | 8,000         | 240     | 38,750       | 1,677     | 356,833     | 8,075     |
| Whiting                 |               |         | 3,850        | 185       | 41,050      | 677       |
| Miscellaneous fish      | 245,750       | 5,522   |              |           | 245,750     | 5,522     |
| Refuse fish             | 1,012,000     | 1,222   |              |           | 1,067,000   | 1,576     |
| Squid, fresh            | 124,000       | 1,375   | 6,900        | 150       | 1,195,325   | 16,095    |
| Squid, salted           |               |         |              |           | 5,000       | 50        |
| Crabs, fiddler          | 128           | 78      |              |           | 128         | 78        |
| Crabs, hard             | 7,875         | 575     |              |           | 7,875       | 575       |
| Crabs, soft             | 5,020         | 1,675   |              |           | 5,020       | 1,675     |
| Lobsters                | 578,066       | 43,290  | 1,098,192    | 83,748    | 14,661,808  | 1,276,967 |
| Shrimp                  | 2,250         | 750     |              |           | 27,450      | 1,933     |
| Quahogs or hard clams   | 249,696       | 31,816  | 234,000      | 29,900    | 994,232     | 112,440   |
| Clams (soft), fresh     | 150,150       | 20,569  | 199,800      | 19,039    | 10,585,701  | 417,447   |
| Clams (soft), salted    |               |         |              |           | 711,200     | 48,568    |
| Mussels                 | 15,550        | 694     |              |           | 22,950      | 824       |
| Oysters                 | 3,201,646     | 505,378 | 14,633,283   | 1,249,071 | 18,543,504  | 1,910,684 |
| Scallops                | 115,386       | 10,471  | 50,160       | 5,016     | 1,207,567   | 124,960   |
| Winkles                 |               |         |              |           | 9,500       | 475       |
| Irish moss              |               |         |              |           | 770,000     | 24,825    |
| Caviar                  |               |         |              |           | 845         | 454       |
| Sounds and tongues      | 2,100         | 630     |              |           | 351,579     | 16,273    |
| Haddock spawn           |               |         |              |           | 700         | 13        |
| Halibut fins            |               |         |              |           | 21,900      | 384       |
| Livers                  |               |         |              |           | 672,800     | 5,497     |
| Oyster shells           | 7,674,000     | 3,968   |              |           | 7,674,000   | 3,968     |
| Oil fish                |               |         |              |           | 531,097     | 19,029    |
| Oil, sea-elephant       |               |         |              |           | 472,500     | 20,790    |
| Oil, whale              |               |         |              |           | 3,119,450   | 199,023   |
| Whalebone               |               |         |              |           | 27,100      | 65,875    |
| Total                   | 32,854,396    | 955,058 | 31,920,417   | 1,559,599 | 393,457,906 | 9,682,290 |

*Comparative table showing the extent of the fisheries of the New England States in 1889 and 1898.*

## PERSONS ENGAGED.

| States.            | 1889.   | 1898.   | Increase or decrease in 1898 as compared with 1889. | Percentage of increase or decrease in 1898 as compared with 1889. |
|--------------------|---------|---------|---|---|
| Maine.....         | 14, 129 | 16, 954 | +2, 825   | +19. 99   |
| New Hampshire..... | 365     | 154     | - 211   | -57. 80   |
| Massachusetts..... | 17, 238 | 14, 363 | -2, 875   | -16. 68   |
| Rhode Island.....  | 1, 757  | 1, 687  | - 70  | - 3. 98   |
| Connecticut.....   | 3, 047  | 2, 473  | - 574   | -18. 84   |
| Total.....         | 36, 536 | 35, 631 | - 905   | - 2. 48   |

## CAPITAL INVESTED.

| States.            | 1889.         | 1898.         | Increase or decrease in 1898 as compared with 1889. | Percentage of increase or decrease in 1898 as compared with 1889. |
|--------------------|---------------|---------------|---|---|
| Maine.....         | \$2, 889, 893 | \$4, 013, 053 | +\$1, 123, 160                                      | +38. 87   |
| New Hampshire..... | 112, 660      | 52, 648       | - 60, 012   | -53. 27   |
| Massachusetts..... | 13, 245, 229  | 13, 372, 902  | + 127, 673  | + . 96  |
| Rhode Island.....  | 1, 020, 178   | 957, 142      | - 63, 036   | - 6. 18   |
| Connecticut.....   | 2, 826, 834   | 1, 241, 291   | - 1, 585, 543                                       | -56. 09   |
| Total.....         | 20, 094, 794  | 19, 637, 036  | - 457, 758  | - 2. 28   |

## PRODUCTS.

| States.            | Lbs.          |               |   | Percentage of increase or decrease in 1898 as compared with 1889. |
|--------------------|---------------|---------------|---|---|
|                    | 1889.         | 1898.         | Increase or decrease in 1898 as compared with 1889. |   |
| Maine.....         | 129, 559, 864 | 123, 404, 561 | - 6, 155, 303                                       | - 4. 75   |
| New Hampshire..... | 4, 354, 568   | 3, 020, 715   | - 1, 333, 853                                       | -30. 63   |
| Massachusetts..... | 299, 217, 669 | 202, 257, 817 | - 96, 959, 852                                      | -32. 40   |
| Rhode Island.....  | 127, 365, 475 | 32, 854, 396  | - 94, 511, 079                                      | -74. 20   |
| Connecticut.....   | 92, 672, 464  | 31, 920, 417  | - 60, 752, 047                                      | -65. 56   |
| Total.....         | 658, 170, 040 | 393, 457, 906 | -259, 712, 134                                      | -39. 76   |

| States.            | Value.        |               |   | Percentage of increase or decrease in 1898 as compared with 1889. |
|--------------------|---------------|---------------|---|---|
|                    | 1889.         | 1898.         | Increase or decrease in 1898 as compared with 1889. |   |
| Maine.....         | \$2, 111, 206 | \$2, 654, 919 | + \$543, 713  | +25. 75   |
| New Hampshire..... | 88, 511       | 48, 987       | - 39, 524   | -44. 65   |
| Massachusetts..... | 5, 858, 274   | 4, 463, 727   | -1, 394, 547  | -23. 80   |
| Rhode Island.....  | 935, 144      | 955, 058      | + 19, 914   | + 2. 13   |
| Connecticut.....   | 1, 557, 506   | 1, 559, 599   | + 2, 093  | + . 13  |
| Total.....         | 10, 550, 641  | 9, 682, 290   | - 868, 351  | - 8. 23   |

## FISHERIES OF MAINE.

Among the New England States Maine occupies second place in the extent of its fisheries, being surpassed only by Massachusetts. The lobster fishery is more important than in all the other New England States combined, and the alewife, herring, salmon, shad, smelt, sword-fish, and clam fisheries are more extensive than in any other State in this region. There are also important cod and mackerel fisheries.

The persons engaged in fisheries in 1898 numbered 16,954, of whom 1,947 were employed on vessels, 6,770 in the shore fisheries, and 8,237 were shoresmen. The number of vessels fishing and transporting was 497, valued, with their outfits, at \$720,827. The number of boats was 5,741, worth \$284,897. The apparatus in the vessel fisheries was valued at \$65,777, and in the shore fisheries at \$362,975. The total investment, including shore property and cash capital, was \$4,013,053.

The fishery products amounted to 123,404,561 pounds, valued at \$2,654,919. The lobster fishery yielded 11,183,294 pounds, worth \$992,855; of clams, fresh and salted, there were 9,470,000 pounds, worth \$323,453; cod, fresh and salted, 15,323,710 pounds, worth \$314,255. The cusk, haddock, hake, and pollock, taken in the cod fisheries, aggregated 27,321,361 pounds, worth \$299,914. The herring fishery yielded 42,156,964 pounds of fresh, salted, and smoked products, worth \$263,477. The products of the alewife fishery, fresh, salted, and smoked, were 2,519,725 pounds, worth \$25,302.

The following tables show the number of persons employed, the capital invested, and the quantity and value of products for 1898:

*Persons employed.*

| How engaged.                     | No.    |
|----------------------------------|--------|
| On vessels fishing .....         | 1,734  |
| On vessels transporting .....    | 213    |
| In shore or boat fisheries ..... | 6,770  |
| Shoresmen .....                  | 8,237  |
| Total .....                      | 16,954 |

*Table of apparatus and capital.*

| Items.                      | No.    | Value.    | Items.                             | No.     | Value.    |
|-----------------------------|--------|-----------|------------------------------------|---------|-----------|
| Vessels fishing .....       | 411    | \$380,750 | Apparatus—shore fisheries—         |         |           |
| Tonnage .....               | 6,791  |           | continued.                         |         |           |
| Outfit .....                |        | 151,621   | Weirs .....                        | 557     | \$111,618 |
| Vessels transporting .....  | 86     | 157,650   | Gill nets .....                    | 2,265   | 25,894    |
| Tonnage .....               | 1,384  |           | Fyke nets .....                    | 26      | 710       |
| Outfit .....                |        | 30,806    | Dip nets .....                     | 182     | 637       |
| Boats .....                 | 5,741  | 284,897   | Bag nets .....                     | 202     | 8,645     |
| Apparatus—vessel fisheries: |        |           | Snap nets .....                    | 20      | 20        |
| Gill nets .....             | 1,457  | 11,519    | Seines .....                       | 208     | 15,165    |
| Seines .....                | 43     | 14,495    | Lines, hand and trawl .....        |         | 27,712    |
| Lines, hand and trawl ..... |        | 24,253    | Pots, eel .....                    | 303     | 180       |
| Pots, eel .....             | 30     | 8         | Pots, lobster .....                | 141,740 | 141,539   |
| Pots, lobster .....         | 14,238 | 14,238    | Spears .....                       | 145     | 127       |
| Hoes .....                  | 27     | 14        | Hoes and rakes .....               | 2,107   | 1,180     |
| Dredges .....               | 15     | 95        | Dredges .....                      | 133     | 743       |
| Harppoons .....             |        | 1,155     | Shore and accessory property ..... |         | 1,193,478 |
| Apparatus—shore fisheries:  |        |           | Cash capital .....                 |         | 1,385,099 |
| Pound nets .....            | 67     | 14,680    |                                    |         |           |
| Trap nets .....             | 33     | 14,125    | Total .....                        |         | 4,013,053 |

Table of products.

| Species.         | Vessel fisheries. |          | Shore fisheries. |           | Total.      |           |
|------------------|-------------------|----------|------------------|-----------|-------------|-----------|
|                  | Lbs.              | Value.   | Lbs.             | Value.    | Lbs.        | Value.    |
| Alewives, fresh  |                   |          | 925,325          | \$8,016   | 925,325     | \$8,016   |
| Alewives, salted |                   |          | 986,600          | 8,437     | 986,600     | 8,437     |
| Alewives, smoked |                   |          | 606,800          | 8,849     | 606,800     | 8,849     |
| Butter-fish      |                   |          | 14,800           | 740       | 14,800      | 740       |
| Cat-fish         |                   |          | 4,000            | 40        | 4,000       | 40        |
| Cod, fresh       | 4,760,222         | \$78,084 | 5,330,866        | 89,147    | 10,091,088  | 167,231   |
| Cod, salted      | 3,938,308         | 116,096  | 1,294,314        | 30,928    | 5,232,622   | 147,024   |
| Cunners          |                   |          | 148,300          | 1,025     | 148,300     | 1,025     |
| Cusk, fresh      | 836,604           | 9,069    | 301,597          | 3,476     | 1,138,201   | 12,545    |
| Cusk, salted     | 48,469            | 695      | 38,198           | 515       | 86,667      | 1,210     |
| Eels, fresh      | 7,700             | 347      | 152,911          | 12,275    | 160,611     | 12,622    |
| Eels, salted     |                   |          | 3,200            | 320       | 3,200       | 320       |
| Flounders        | 48,929            | 890      | 737,768          | 16,649    | 786,697     | 17,539    |
| Haddock, fresh   | 4,035,065         | 71,557   | 3,239,844        | 48,425    | 7,274,909   | 119,982   |
| Haddock, salted  | 514,850           | 7,563    | 441,807          | 4,806     | 956,657     | 12,369    |
| Hake, fresh      | 8,036,028         | 62,708   | 5,293,871        | 47,850    | 13,329,899  | 110,558   |
| Hake, salted     | 1,271,903         | 11,916   | 1,133,675        | 11,970    | 2,405,578   | 23,886    |
| Halibut          | 165,256           | 11,676   | 139,634          | 10,399    | 304,890     | 22,075    |
| Herring, fresh   | 5,075,650         | 47,122   | 31,942,164       | 127,191   | 37,017,814  | 174,313   |
| Herring, salted  | 553,650           | 13,602   | 847,000          | 12,557    | 1,400,650   | 26,159    |
| Herring, smoked  |                   |          | 3,738,500        | 63,005    | 3,738,500   | 63,005    |
| Mackerel, fresh  | 410,860           | 40,127   | 1,030,297        | 45,217    | 1,441,157   | 85,344    |
| Mackerel, salted | 134,000           | 10,586   | 29,000           | 2,175     | 163,000     | 12,761    |
| Menhaden, fresh  | 6,670,000         | 16,720   | 110,000          | 385       | 6,780,000   | 17,105    |
| Menhaden, salted | 48,400            | 726      | 491,500          | 2,875     | 539,900     | 3,601     |
| Pollock, fresh   | 514,354           | 3,913    | 612,392          | 4,550     | 1,126,746   | 8,463     |
| Pollock, salted  | 411,256           | 3,917    | 591,448          | 6,984     | 1,002,704   | 10,901    |
| Salmon           |                   |          | 53,322           | 10,009    | 53,322      | 10,009    |
| Shad, fresh      | 100,000           | 1,800    | 601,879          | 12,206    | 701,879     | 14,006    |
| Shad, salted     | 83,200            | 2,496    | 76,800           | 3,250     | 160,000     | 5,746     |
| Smelt            | 36,168            | 2,170    | 1,571,882        | 137,175   | 1,608,045   | 139,345   |
| Striped bass     |                   |          | 25,067           | 4,206     | 25,067      | 4,206     |
| Sturgeon         |                   |          | 12,075           | 367       | 12,075      | 367       |
| Suckers          |                   |          | 200              | 1         | 200         | 1         |
| Sword-fish       | 878,290           | 44,395   |                  |           | 878,290     | 44,395    |
| Tomcod           | 13,538            | 542      | 296,545          | 5,616     | 310,083     | 6,158     |
| Refuse fish      |                   |          | 55,000           | 354       | 55,000      | 354       |
| Lobsters         | 907,831           | 91,924   | 10,275,463       | 900,931   | 11,183,294  | 992,855   |
| Clams, fresh     | 53,000            | 1,370    | 8,705,800        | 273,515   | * 8,758,800 | 274,885   |
| Clams, salted    | 83,000            | 1,660    | 628,200          | 46,908    | † 711,200   | 48,568    |
| Scallops         | 16,238            | 1,396    | 150,271          | 13,126    | † 166,509   | 14,522    |
| Caviar           |                   |          | 845              | 454       | 845         | 454       |
| Livers           | 446,320           | 3,637    | 226,480          | 1,860     | 672,800     | 5,497     |
| Sounds           | 159,158           | 7,175    | 114,884          | 5,469     | 274,042     | 12,644    |
| Tongues          | 4,045             | 102      | 3,830            | 94        | 7,875       | 196       |
| Oil              | 122,400           | 3,420    | 35,520           | 1,171     | 157,920     | 4,591     |
| Total            | 40,384,687        | 669,401  | 83,019,874       | 1,985,518 | 123,404,561 | 2,654,919 |

\* Represents 875,880 bushels.

† Represents 42,672 bushels.

‡ Represents 27,752 bushels.

## THE FISHERIES BY COUNTIES.

Commercial fishing is carried on from all of the coast counties and from two counties situated on the Penobscot River.

The number of persons employed in Washington County in 1898 was 7,322; of these, 5,863 were shoresmen engaged principally in the sardine and other branches of the herring industry. In Hancock County there were 3,173 persons, of whom 681 were employed on vessels. The vessel fisheries of this county are more important than those of any other county. The fisheries of Lincoln County employed 2,209 persons, those of Cumberland and Knox 1,662 and 1,421 respectively. The fisheries of the remaining four counties were less extensive, employing only 1,167 persons.

The counties having the largest amount of capital invested were Washington, Lincoln, Cumberland, and Hancock.

The investment in the fisheries of Washington County, owing to an extensive sardine industry, was nearly twice that of any other county, amounting to \$1,413,825. The investment in Lincoln County was \$750,622, in Cumberland \$733,041, and in Hancock \$552,491. The largest number of vessels, 178, valued at \$142,100, is in Hancock County. Knox County has 98, valued at \$90,000; Cumberland 73, valued at \$110,400; Lincoln 59, valued at \$102,650, and Washington 57, worth \$70,250. A comparatively small number is employed in each of the other counties. A number of the transporting vessels above included are steamers used in the lobster-carrying trade.

In the vessel fisheries gill nets are used extensively in three counties, and hand and trawl lines in four counties. Lobster pots are employed in all but two counties, the largest number being in Hancock and Knox, the former having 7,146 and the latter 4,140.

In the shore fisheries the largest number of boats are in Hancock County, being 1,419. Two other counties, Washington and Cumberland, each have nearly 1,000. The forms of apparatus most extensively used are weirs and gill nets in Washington County, weirs in Hancock, gill nets in Knox, weirs and gill nets in Sagadahoc, and gill nets in Cumberland and York counties. Lobster pots are the most numerous form of apparatus in all counties except Penobscot.

Lincoln County leads in the quantity of products secured, with 32,323,528 pounds, valued at \$521,186, but is exceeded in value by Hancock County with 20,775,195 pounds, valued at \$617,619. Washington County leads in the herring and pollock fisheries; Hancock County in the cod, flounder, salmon, scallop, and lobster fisheries; Knox County in the cusk and hake fisheries; Lincoln County in the alewife, mackerel, menhaden, shad, and smelt fisheries, and Cumberland County in the haddock, sword-fish, and clam fisheries.

In 1889 scallops were taken only in Hancock County, while they are now secured in Washington, Hancock, Waldo, Knox, Lincoln, and Cumberland counties. There may also be other grounds in various parts of the State which have not yet been discovered.

The three following tables show the extent of the fisheries in each county of Maine in 1898:

*Table showing the number of persons employed in the fisheries of Maine in 1898.*

| Counties.        | On vessels fishing. | On vessels transporting. | In shore or boat fisheries. | Shoresmen. | Total. |
|------------------|---------------------|--------------------------|-----------------------------|------------|--------|
| Washington ..... | 111                 | 63                       | 1,285                       | 5,863      | 7,322  |
| Hancock .....    | 649                 | 32                       | 1,669                       | 823        | 3,173  |
| Penobscot .....  | 3                   | .....                    | 13                          | .....      | 16     |
| Waldo .....      | 24                  | .....                    | 134                         | .....      | 158    |
| Knox .....       | 238                 | 64                       | 858                         | 261        | 1,421  |
| Lincoln .....    | 300                 | 15                       | 954                         | 940        | 2,209  |
| Sagadahoc .....  | 16                  | 2                        | 521                         | 4          | 543    |
| Cumberland ..... | 325                 | 37                       | 964                         | 336        | 1,662  |
| York .....       | 68                  | .....                    | 372                         | 10         | 450    |
| Total .....      | 1,734               | 213                      | 6,770                       | 8,237      | 16,954 |

Table showing, by counties, the vessels, boats, apparatus, and capital employed in the fisheries of Maine in 1898.

| Items.                             | Washington. |           | Hancock. |           | Penobscot. |        | Waldo. |         | Knox.  |          |
|------------------------------------|-------------|-----------|----------|-----------|------------|--------|--------|---------|--------|----------|
|                                    | No.         | Value.    | No.      | Value.    | No.        | Value. | No.    | Value.  | No.    | Value.   |
| Vessels fishing .....              | 32          | \$22,200  | 166      | \$118,250 | 2          | \$500  | 8      | \$4,600 | 71     | \$47,800 |
| Tonnage .....                      | 893         |           | 2,476    |           | 10         |        | 99     |         | 915    |          |
| Outfit .....                       |             | 4,872     |          | 50,411    |            | 45     |        | 820     |        | 18,238   |
| Vessels transporting .....         | 25          | 48,050    | 12       | 23,850    |            |        |        |         | 27     | 42,200   |
| Tonnage .....                      | 387         |           | 181      |           |            |        |        |         | 456    |          |
| Outfit .....                       |             | 7,485     |          | 5,810     |            |        |        |         |        | 9,165    |
| Boats .....                        | 987         | 80,816    | 1,419    | 68,377    | 13         | 143    | 112    | 2,823   | 882    | 44,097   |
| Apparatus—vessel fisheries:        |             |           |          |           |            |        |        |         |        |          |
| Gill nets .....                    | 27          | 176       | 361      | 3,118     |            |        | 10     | 100     | 439    | 2,990    |
| Seines .....                       |             |           | 5        | 1,400     |            |        |        |         | 3      | 710      |
| Lines, hand and trawl .....        |             | 998       |          | 3,975     |            | 29     |        | 163     |        | 3,934    |
| Pots, eel .....                    |             |           | 30       | 8         |            |        |        |         |        |          |
| Pots, lobster .....                | 1,710       | 1,710     | 7,146    | 7,146     | 82         | 82     |        |         | 4,140  | 4,140    |
| Hoes .....                         |             |           | 17       | 9         |            |        | 6      | 3       | 4      | 2        |
| Dredges .....                      |             |           | 13       | 81        |            |        | 2      | 14      |        |          |
| Harpoons .....                     |             |           |          | 5         |            |        |        |         |        | 60       |
| Apparatus—shore fisheries:         |             |           |          |           |            |        |        |         |        |          |
| Pound nets .....                   |             |           |          |           |            |        | 38     | 1,900   | 7      | 380      |
| Trap nets .....                    | 3           | 75        | 5        | 650       |            |        |        |         | 3      | 2,450    |
| Weirs .....                        | 149         | 37,189    | 155      | 20,475    | 3          | 150    | 30     | 2,426   | 33     | 11,822   |
| Gill nets .....                    | 272         | 4,901     | 90       | 738       | 10         | 270    |        |         | 126    | 1,277    |
| Fyke nets .....                    |             |           |          |           |            |        | 4      | 60      |        |          |
| Dip nets .....                     | 123         | 528       | 15       | 45        |            |        |        |         | 6      | 12       |
| Bag nets .....                     | 65          | 1,580     | 58       | 2,205     | 8          | 450    | 30     | 1,300   |        |          |
| Seines .....                       |             |           | 74       | 3,595     |            |        |        |         | 19     | 1,400    |
| Lines, hand and trawl .....        |             | 847       |          | 1,499     |            |        |        | 76      |        | 4,621    |
| Pots, eel .....                    | 70          | 18        | 70       | 35        |            |        |        |         |        |          |
| Pots, lobster .....                | 22,390      | 22,373    | 23,880   | 23,880    |            |        | 575    | 575     | 39,040 | 39,030   |
| Spears .....                       |             |           | 22       | 15        |            |        |        |         | 4      | 8        |
| Hoes and rakes .....               | 280         | 246       | 774      | 399       |            |        | 45     | 23      | 217    | 109      |
| Dredges .....                      | 11          | 37        | 88       | 530       |            |        | 5      | 31      | 4      | 20       |
| Shore and accessory property ..... |             | 467,824   |          | 126,561   |            | 100    |        | 477     |        | 90,694   |
| Cash capital .....                 |             | 711,900   |          | 89,424    |            |        |        |         |        | 94,600   |
| Total .....                        |             | 1,413,825 |          | 552,491   |            | 1,769  |        | 15,391  |        | 419,759  |

| Items.                             | Lincoln. |          | Sagadahoc. |         | Cumberland. |          | York. |          |
|------------------------------------|----------|----------|------------|---------|-------------|----------|-------|----------|
|                                    | No.      | Value.   | No.        | Value.  | No.         | Value.   | No.   | Value.   |
| Vessels fishing .....              | 53       | \$91,250 | 6          | \$2,600 | 58          | \$78,400 | 15    | \$15,150 |
| Tonnage .....                      | 1,040    |          | 58         |         | 1,571       |          | 229   |          |
| Outfit .....                       |          | 30,439   |            | 1,068   |             | 38,318   |       | 7,410    |
| Vessels transporting .....         | 6        | 11,400   | 1          | 150     | 15          | 32,000   |       |          |
| Tonnage .....                      | 110      |          | 8          |         | 242         |          |       |          |
| Outfit .....                       |          | 2,548    |            | 30      |             | 5,768    |       |          |
| Boats .....                        | 758      | 23,881   | 332        | 6,704   | 946         | 47,596   | 292   | 10,460   |
| Apparatus—vessel fisheries:        |          |          |            |         |             |          |       |          |
| Gill nets .....                    | 178      | 1,328    |            |         | 387         | 3,367    | 55    | 440      |
| Seines .....                       | 22       | 8,825    |            |         | 13          | 3,560    |       |          |
| Lines, hand and trawl .....        |          | 3,805    |            | 456     |             | 8,613    |       | 2,280    |
| Pots, eel .....                    |          |          |            |         |             |          |       |          |
| Pots, lobster .....                | 510      | 510      |            |         | 400         | 400      | 250   | 250      |
| Harpoons .....                     |          |          |            |         |             | 987      |       | 103      |
| Apparatus—shore fisheries:         |          |          |            |         |             |          |       |          |
| Pound nets .....                   |          |          | 7          | 4,200   | 15          | 8,200    |       |          |
| Trap nets .....                    | 1        | 1,000    |            |         | 15          | 6,950    | 6     | 3,000    |
| Weirs .....                        | 55       | 24,084   | 105        | 12,582  | 26          | 1,390    | 1     | 1,500    |
| Gill nets .....                    | 83       | 745      | 417        | 4,795   | 717         | 6,684    | 550   | 6,484    |
| Fyke nets .....                    | 2        | 80       | 10         | 450     | 10          | 120      |       |          |
| Dip nets .....                     | 18       | 22       | 15         | 15      |             |          | 5     | 15       |
| Bag nets .....                     | 2        | 80       | 38         | 2,985   | 1           | 45       |       |          |
| Snap nets .....                    |          |          |            |         | 20          | 20       |       |          |
| Seines .....                       | 56       | 3,790    | 2          | 170     | 52          | 5,750    | 5     | 460      |
| Lines, hand and trawl .....        |          | 6,856    |            | 686     |             | 9,515    |       | 3,612    |
| Pots, eel .....                    |          |          | 133        | 117     |             |          | 30    | 10       |
| Pots, lobster .....                | 29,190   | 29,190   | 2,138      | 1,964   | 17,932      | 17,932   | 6,595 | 6,595    |
| Spears .....                       | 60       | 43       | 6          | 3       | 53          | 58       |       |          |
| Hoes and rakes .....               | 251      | 127      | 55         | 28      | 365         | 187      | 120   | 61       |
| Dredges .....                      | 12       | 60       |            |         | 13          | 65       |       |          |
| Shore and accessory property ..... |          | 299,559  |            | 7,629   |             | 190,016  |       | 10,618   |
| Cash capital .....                 |          | 211,000  |            | 1,000   |             | 267,100  |       | 10,075   |
| Total .....                        |          | 750,622  |            | 47,632  |             | 733,041  |       | 78,523   |



Table showing, by counties, the products of the fisheries of Maine in 1898. .

| Species.            | Washington. |         | Hancock.   |         | Penobscot. |        | Waldo.  |        | Knox.      |         |
|---------------------|-------------|---------|------------|---------|------------|--------|---------|--------|------------|---------|
|                     | Lbs.        | Value.  | Lbs.       | Value.  | Lbs.       | Value. | Lbs.    | Value. | Lbs.       | Value.  |
| Alewives, fresh ..  | 135,200     | \$866   | 244,300    | \$1,698 | 8,500      | \$57   | 29,100  | \$342  | 62,775     | \$473   |
| Alewives, salted .. | 25,000      | 250     |            |         |            |        |         |        | 173,100    | 3,008   |
| Alewives, smoked .. | 38,000      | 760     | 129,100    | 1,291   |            |        | 32,000  | 448    | 137,500    | 2,150   |
| Cat-fish ..         |             |         |            |         |            |        |         |        | 4,000      | 40      |
| Cod, fresh ..       | 375,420     | 9,682   | 673,229    | 11,772  | 14,000     | 280    | 39,900  | 898    | 1,284,258  | 17,043  |
| Cod, salted ..      | 619,215     | 14,303  | 3,559,307  | 99,132  |            |        |         |        | 44,706     | 728     |
| Cusk, fresh ..      |             |         | 22,250     | 273     |            |        |         |        | 481,077    | 5,189   |
| Cusk, salted ..     | 23,380      | 383     | 28,469     | 355     |            |        |         |        | 16,000     | 181     |
| Eels ..             | 11,200      | 940     | 11,616     | 660     |            |        |         |        | 5,800      | 544     |
| Flounders ..        | 12,300      | 123     | 611,563    | 12,880  |            |        | 10,534  | 220    | 42,919     | 988     |
| Haddock, fresh ..   | 221,014     | 3,832   | 521,355    | 8,001   | 8,000      | 80     | 29,300  | 516    | 800,638    | 4,032   |
| Haddock, salted ..  | 235,790     | 2,157   | 638,117    | 9,248   |            |        |         |        | 10,250     | 73      |
| Hake, fresh ..      | 37,275      | 366     | 667,183    | 7,057   | 12,500     | 125    | 77,750  | 895    | 4,984,285  | 34,608  |
| Hake, salted ..     | 446,180     | 4,168   | 1,520,906  | 14,245  |            |        |         |        | 89,100     | 767     |
| Halibut ..          | 62,800      | 4,433   | 128,805    | 9,817   |            |        | 800     | 68     | 40,786     | 3,159   |
| Herring, fresh ..   | 14,050,550  | 47,629  | 5,852,170  | 29,861  |            |        | 4,800   | 12     | 4,662,580  | 17,482  |
| Herring, salted ..  | 416,000     | 8,520   | 60,000     | 1,350   |            |        | 26,250  | 473    | 472,600    | 5,262   |
| Herring, smoked ..  | 3,738,500   | 63,005  |            |         |            |        |         |        |            |         |
| Mackerel, fresh ..  | 2,250       | 20      | 217,640    | 2,123   |            |        | 1,000   | 20     | 192,437    | 7,955   |
| Mackerel, salted .. |             |         | 15,800     | 1,225   |            |        |         |        |            |         |
| Menhaden, fresh ..  |             |         |            |         |            |        |         |        | 130,000    | 455     |
| Pollock, fresh ..   | 93,360      | 1,057   | 90,055     | 875     | 5,300      | 53     | 11,000  | 92     | 202,402    | 869     |
| Pollock, salted ..  | 485,345     | 5,809   | 474,714    | 4,794   |            |        |         |        | 6,700      | 50      |
| Salmon ..           | 10,860      | 1,648   | 19,740     | 3,911   | 1,778      | 397    | 19,350  | 3,740  | 1,412      | 267     |
| Shad ..             | 81,565      | 2,712   | 7,450      | 407     |            |        |         |        | 2,000      | 80      |
| Smelt ..            | 208,996     | 23,202  | 353,409    | 42,313  | 6,400      | 832    | 46,900  | 6,034  | 46,674     | 3,601   |
| Sword-fish ..       |             |         | 35,710     | 2,500   |            |        |         |        | 58,547     | 2,815   |
| Tomcod ..           | 116,400     | 1,207   | 15,500     | 174     | 7,000      | 280    | 9,200   | 172    | 1,939      | 19      |
| Refuse fish ..      |             |         | 16,900     | 169     |            |        | 6,100   | 25     |            |         |
| Lobsters ..         | 1,628,704   | 140,189 | 2,643,222  | 251,491 | 1,264      | 118    | 17,766  | 1,713  | 2,451,944  | 216,363 |
| Clams, fresh ..     | 1,315,200   | 26,840  | 1,549,080  | 44,726  |            |        | 60,820  | 2,441  | 2,054,940  | 70,732  |
| Clams, salted ..    | 108,000     | 2,160   | 264,600    | 38,880  |            |        |         |        | 17,000     | 340     |
| Scallops ..         | 4,000       | 400     | 124,595    | 10,317  |            |        | 3,695   | 319    | 8,075      | 850     |
| Livers ..           | 34,600      | 275     | 116,720    | 913     |            |        | 1,500   | 11     | 258,540    | 1,941   |
| Sounds ..           | 10,490      | 485     | 34,775     | 1,661   |            |        | 930     | 45     | 91,704     | 3,936   |
| Tongues ..          | 1,360       | 42      | 6,315      | 150     |            |        |         |        | 200        | 4       |
| Oil ..              |             |         | 120,600    | 3,350   |            |        |         |        |            |         |
| Total ..            | 24,548,954  | 367,468 | 20,775,195 | 617,619 | 64,742     | 2,222  | 428,695 | 18,424 | 18,836,882 | 405,954 |

| Species.            | Lincoln.   |         | Sagadahoc. |        | Cumberland. |         | York.     |         |
|---------------------|------------|---------|------------|--------|-------------|---------|-----------|---------|
|                     | Lbs.       | Value.  | Lbs.       | Value. | Lbs.        | Value.  | Lbs.      | Value.  |
| Alewives, fresh ..  | 388,950    | \$4,183 | 7,500      | \$112  | 45,000      | \$225   | 4,000     | \$60    |
| Alewives, salted .. | 788,500    | 5,179   |            |        |             |         |           |         |
| Alewives, smoked .. | 270,200    | 4,200   |            |        |             |         |           |         |
| Butter-fish ..      |            |         |            |        | 14,800      | 740     |           |         |
| Cod, fresh ..       | 2,011,969  | 30,479  | 417,929    | 7,925  | 3,871,654   | 63,264  | 1,402,729 | 25,888  |
| Cod, salted ..      | 835,100    | 27,162  |            |        | 12,100      | 242     | 162,200   | 5,457   |
| Cunners ..          |            |         |            |        | 148,300     | 1,025   |           |         |
| Cusk, fresh ..      | 263,308    | 2,970   | 14,443     | 194    | 311,876     | 3,266   | 45,247    | 653     |
| Cusk, salted ..     | 12,518     | 187     |            |        |             |         | 6,300     | 99      |
| Eels ..             | 37,900     | 3,078   | 39,275     | 2,967  | 52,420      | 4,193   | 5,600     | 560     |
| Flounders ..        | 89,641     | 2,982   |            |        | 19,740      | 396     |           |         |
| Haddock, fresh ..   | 739,667    | 10,793  | 177,088    | 3,152  | 3,725,938   | 71,690  | 1,051,909 | 17,886  |
| Haddock, salted ..  | 43,500     | 356     |            |        | 9,000       | 135     | 20,000    | 400     |
| Hake, fresh ..      | 2,982,478  | 24,098  | 123,800    | 1,238  | 3,887,340   | 36,613  | 557,288   | 5,618   |
| Hake, salted ..     | 226,192    | 1,909   |            |        | 10,200      | 82      | 113,000   | 2,715   |
| Halibut ..          | 17,699     | 1,358   |            |        | 54,000      | 3,240   |           |         |
| Herring, fresh ..   | 11,532,270 | 72,833  | 119,000    | 850    | 601,800     | 4,004   | 194,644   | 1,642   |
| Herring, salted ..  | 376,000    | 9,776   |            |        | 28,800      | 541     | 21,000    | 237     |
| Mackerel, fresh ..  | 444,932    | 35,685  | 31,200     | 1,380  | 356,497     | 23,626  | 195,201   | 14,585  |
| Mackerel, salted .. | 123,000    | 9,225   |            |        | 24,200      | 2,311   |           |         |
| Menhaden, fresh ..  | 6,650,000  | 16,650  |            |        |             |         |           |         |
| Menhaden, salted .. |            |         | 92,500     | 481    | 447,400     | 3,120   |           |         |
| Pollock, fresh ..   | 247,977    | 1,754   | 3,600      | 24     | 349,302     | 2,535   | 123,750   | 1,204   |
| Pollock, salted ..  | 20,000     | 120     |            |        | 5,745       | 46      | 10,200    | 82      |
| Salmon ..           |            |         |            |        |             |         | 182       | 46      |
| Shad ..             | 339,900    | 6,798   | 303,764    | 6,722  | 125,200     | 2,983   | 2,000     | 50      |
| Smelt ..            | 448,053    | 30,426  | 106,545    | 8,502  | 367,968     | 23,049  | 23,100    | 1,386   |
| Striped bass ..     | 9,000      | 1,350   | 16,067     | 2,856  |             |         |           |         |
| Sturgeon ..         |            |         | 12,075     | 367    |             |         |           |         |
| Suckers ..          |            |         | 200        | 1      |             |         |           |         |
| Sword-fish ..       |            |         |            |        | 648,233     | 32,412  | 135,800   | 6,668   |
| Tomcod ..           | 24,600     | 236     | 20,400     | 170    | 110,844     | 3,732   | 4,200     | 168     |
| Refuse fish ..      |            |         |            |        | 32,000      | 160     |           |         |
| Lobsters ..         | 2,155,517  | 185,774 | 384,900    | 30,392 | 1,423,691   | 120,616 | 476,386   | 46,199  |
| Clams, fresh ..     | 1,094,290  | 27,858  | 91,400     | 2,337  | 2,217,870   | 81,341  | 375,200   | 19,110  |
| Clams, salted ..    | 32,000     | 670     |            |        | 289,600     | 6,518   |           |         |
| Scallops ..         | 5,529      | 466     |            |        | 20,615      | 2,170   |           |         |
| Caviar ..           |            |         | 845        | 454    |             |         |           |         |
| Livers ..           | 53,400     | 421     | 4,640      | 41     | 174,720     | 1,608   | 28,680    | 287     |
| Sounds ..           | 48,638     | 2,350   | 1,783      | 83     | 74,043      | 3,476   | 11,679    | 603     |
| Oil ..              | 10,800     | 360     | 12,600     | 420    | 10,080      | 336     | 3,840     | 125     |
| Total ..            | 32,323,528 | 521,186 | 1,981,554  | 70,668 | 19,470,876  | 499,695 | 4,974,135 | 151,683 |

## THE FISHERIES BY APPARATUS.

The products of the vessel fisheries aggregated 40,384,687 pounds, valued at \$669,401, and of the shore fisheries 83,019,874 pounds, valued at \$1,985,518. The more important forms of apparatus employed and the quantity and value of their catch were lobster and eel pots, 11,241,935 pounds, \$997,146; hand and trawl lines, 44,627,264 pounds, \$718,095; hoes, rakes, and dredges, 9,636,509 pounds, \$337,975; seines, 13,612,954 pounds, \$167,798; gill nets, 5,528,884 pounds, \$101,294; pound nets and trap nets, 1,619,513 pounds, \$18,354; weirs, 33,956,221 pounds, \$214,551, and harpoons in the vessel fishery for sword-fish, 878,290 pounds, \$44,395. The remainder of the products was taken with fyke nets, dip nets, bag nets, snap nets, and spears, and amounted to 2,302,991 pounds, valued at \$55,311.

The following tables show by counties and species the number of pounds and value of fishery products taken with each form of apparatus in the vessel and shore fisheries of Maine in 1898:

*Table showing, by counties, the yield of the seine fisheries of Maine in 1898.*

| Species.                  | Knox.   |         | Sagadahoc. |        | York.  |        |
|---------------------------|---------|---------|------------|--------|--------|--------|
|                           | Lbs.    | Value.  | Lbs.       | Value. | Lbs.   | Value. |
| Vessel fisheries:         |         |         |            |        |        |        |
| Mackerel, fresh .....     | 40,200  | \$2,950 |            |        |        |        |
| Shore fisheries:          |         |         |            |        |        |        |
| Alewives .....            | 6,000   | 120     |            |        |        |        |
| Flounders .....           | 42,919  | 938     |            |        |        |        |
| Herring .....             | 180,000 | 450     |            |        | 46,200 | \$330  |
| Mackerel, fresh .....     | 5,564   | 340     |            |        |        |        |
| Shad .....                | 2,000   | 80      | 19,200     | \$384  |        |        |
| Smelt .....               | 19,917  | 1,190   | 1,500      | 90     | 23,100 | 1,386  |
| Tomcod .....              |         |         | 300        | 3      | 4,200  | 168    |
| Total .....               | 256,400 | 3,118   | 21,000     | 477    | 73,500 | 1,884  |
| Total vessel and shore .. | 296,600 | 6,068   | 21,000     | 477    | 73,500 | 1,884  |

| Species.                  | Hancock.  |        | Lincoln.   |          | Cumberland. |        | Total.     |         |
|---------------------------|-----------|--------|------------|----------|-------------|--------|------------|---------|
|                           | Lbs.      | Value. | Lbs.       | Value.   | Lbs.        | Value. | Lbs.       | Value.  |
| Vessel fisheries:         |           |        |            |          |             |        |            |         |
| Flounders .....           | 12,000    | \$300  |            |          | 300         | \$4    | 12,300     | \$304   |
| Herring, fresh .....      | 520,000   | 750    | 3,675,200  | \$28,046 | 82,000      | 507    | 4,277,200  | 29,308  |
| Herring, salted .....     |           |        | 291,500    | 7,579    |             |        | 291,500    | 7,579   |
| Mackerel, fresh .....     |           |        | 145,211    | 20,736   | 73,000      | 4,850  | 258,411    | 28,536  |
| Mackerel, salted .....    |           |        | 94,000     | 7,050    | 24,200      | 2,311  | 118,200    | 9,361   |
| Menhaden .....            |           |        | 6,650,000  | 16,650   |             |        | 6,650,000  | 16,650  |
| Shad, fresh .....         |           |        | 80,000     | 1,600    | 20,000      | 200    | 100,000    | 1,800   |
| Shad, salted .....        |           |        |            |          | 83,200      | 2,496  | 83,200     | 2,496   |
| Smelt .....               |           |        |            |          | 36,163      | 2,170  | 36,163     | 2,170   |
| Tomcod .....              |           |        |            |          | 13,538      | 542    | 13,538     | 542     |
| Total .....               | 532,000   | 1,050  | 10,935,911 | 81,661   | 332,401     | 13,080 | 11,840,512 | 98,741  |
| Shore fisheries:          |           |        |            |          |             |        |            |         |
| Alewives .....            |           |        |            |          | 45,000      | 225    | 51,000     | 345     |
| Flounders .....           | 523,700   | 11,334 | 89,641     | 2,982    | 13,620      | 326    | 669,880    | 15,580  |
| Herring .....             | 9,600     | 36     |            |          | 8,300       | 41     | 244,100    | 857     |
| Mackerel, fresh .....     |           |        | 47,845     | 8,272    |             |        | 53,409     | 8,612   |
| Mackerel, salted .....    |           |        | 29,000     | 2,175    |             |        | 29,000     | 2,175   |
| Pollock .....             | 8,000     | 80     | 12,000     | 60       |             |        | 20,000     | 140     |
| Shad .....                |           |        |            |          |             |        | 21,200     | 464     |
| Smelt .....               | 38,775    | 3,934  | 219,389    | 13,850   | 288,022     | 17,281 | 590,703    | 37,731  |
| Tomcod .....              |           |        |            |          | 85,650      | 2,952  | 90,150     | 3,123   |
| Refuse fish .....         | 3,000     | 30     |            |          |             |        | 3,000      | 30      |
| Total .....               | 583,075   | 15,414 | 397,875    | 27,339   | 440,592     | 20,825 | 1,772,442  | 69,057  |
| Total vessel and shore .. | 1,115,075 | 16,464 | 11,333,786 | 109,000  | 772,993     | 33,905 | 13,612,954 | 167,798 |

# 328 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the yield of the gill-net fisheries of Maine in 1898.

| Species.                    | Washington. |        | Hancock. |         | Penobscot. |        | Waldo. |        | Sagadahoc. |        |
|-----------------------------|-------------|--------|----------|---------|------------|--------|--------|--------|------------|--------|
|                             | Lbs.        | Value. | Lbs.     | Value.  | Lbs.       | Value. | Lbs.   | Value. | Lbs.       | Value. |
| Vessel fisheries:           |             |        |          |         |            |        |        |        |            |        |
| Herring, fresh.....         | 145,000     | \$910  | 398,800  | \$8,871 |            |        |        |        |            |        |
| Herring, salted.....        |             |        |          |         |            |        | 26,250 | \$473  |            |        |
| Total.....                  | 145,000     | 910    | 398,800  | 8,871   |            |        | 26,250 | 473    |            |        |
| Shore fisheries:            |             |        |          |         |            |        |        |        |            |        |
| Alewives.....               |             |        | 6,000    | 110     |            |        |        |        |            |        |
| Herring, fresh.....         | 2,059,750   | 11,263 |          |         |            |        |        |        |            |        |
| Herring, salted.....        | 206,000     | 4,635  | 60,000   | 1,350   |            |        |        |        |            |        |
| Menhaden, salted.....       |             |        |          |         |            |        |        |        | 92,500     | \$481  |
| Salmon.....                 | 2,412       | 362    |          |         | 1,118      | \$232  |        |        |            |        |
| Shad, fresh.....            | 19,000      | 286    |          |         |            |        |        |        | 238,964    | 5,343  |
| Shad, salted.....           | 60,000      | 2,375  | 7,000    | 385     |            |        |        |        | 9,800      | 490    |
| Smelt.....                  | 12,000      | 1,440  |          |         |            |        |        |        |            |        |
| Striped bass.....           |             |        |          |         |            |        |        |        | 15,617     | 2,811  |
| Sturgeon.....               |             |        |          |         |            |        |        |        | 10,875     | 363    |
| Caviar.....                 |             |        |          |         |            |        |        |        | 845        | 454    |
| Total.....                  | 2,359,162   | 20,361 | 73,000   | 1,845   | 1,118      | 232    |        |        | 368,601    | 9,942  |
| Total vessel and shore..... | 2,504,162   | 21,271 | 471,800  | 10,716  | 1,118      | 232    | 26,250 | 473    | 368,601    | 9,942  |

| Species.                    | Knox.   |         | Lincoln. |         | Cumberland. |        | York.   |        | Total.    |          |
|-----------------------------|---------|---------|----------|---------|-------------|--------|---------|--------|-----------|----------|
|                             | Lbs.    | Value.  | Lbs.     | Value.  | Lbs.        | Value. | Lbs.    | Value. | Lbs.      | Value.   |
| Vessel fisheries:           |         |         |          |         |             |        |         |        |           |          |
| Herring, fresh.....         |         |         | 254,650  | \$8,038 |             |        |         |        | 798,450   | \$17,819 |
| Herring, salted.....        | 122,600 | \$2,812 | 84,500   | 2,197   | 28,800      | \$541  |         |        | 262,150   | 6,023    |
| Mackerel.....               | 38,723  | 2,474   | 28,321   | 3,427   | 59,892      | 4,333  | 3,313   | \$265  | 130,249   | 10,499   |
| Menhaden, fresh.....        | 20,000  | 70      |          |         |             |        |         |        | 20,000    | 70       |
| Menhaden, salted.....       |         |         |          |         | 48,400      | 726    |         |        | 48,400    | 726      |
| Total.....                  | 181,323 | 5,356   | 367,471  | 13,662  | 137,092     | 5,600  | 3,313   | 265    | 1,259,249 | 35,137   |
| Shore fisheries:            |         |         |          |         |             |        |         |        |           |          |
| Alewives.....               | 4,500   | 34      | 9,000    | 90      |             |        |         |        | 19,500    | 234      |
| Cod, fresh.....             |         |         |          |         |             |        | 45,250  | 1,600  | 45,250    | 1,600    |
| Cod, salted.....            |         |         |          |         |             |        | 30,000  | 1,050  | 30,000    | 1,050    |
| Herring, fresh.....         | 10,800  | 41      | 6,300    | 62      | 93,000      | 575    | 91,000  | 680    | 2,260,850 | 12,621   |
| Herring, salted.....        | 342,000 | 2,250   |          |         |             |        | 21,000  | 237    | 629,000   | 8,472    |
| Mackerel.....               | 8,250   | 375     |          |         | 148,474     | 10,711 | 82,680  | 10,793 | 239,404   | 21,879   |
| Menhaden, fresh.....        | 110,000 | 385     |          |         |             |        |         |        | 110,000   | 385      |
| Menhaden, salted.....       |         |         |          |         | 399,000     | 2,394  |         |        | 491,500   | 2,875    |
| Salmon.....                 |         |         |          |         |             |        |         |        | 3,530     | 594      |
| Shad, fresh.....            |         |         | 57,500   | 1,150   |             |        |         |        | 315,464   | 6,779    |
| Shad, salted.....           |         |         |          |         |             |        |         |        | 76,800    | 3,250    |
| Smelt.....                  |         |         |          |         |             |        |         |        | 12,000    | 1,440    |
| Striped bass.....           |         |         | 9,000    | 1,350   |             |        |         |        | 24,617    | 4,161    |
| Sturgeon.....               |         |         |          |         |             |        |         |        | 10,875    | 363      |
| Caviar.....                 |         |         |          |         |             |        |         |        | 845       | 454      |
| Total.....                  | 475,550 | 3,085   | 81,800   | 2,652   | 640,474     | 13,680 | 269,930 | 14,360 | 4,269,635 | 66,157   |
| Total vessel and shore..... | 656,873 | 8,441   | 449,271  | 16,314  | 777,566     | 19,280 | 273,243 | 14,625 | 5,528,884 | 101,294  |

Table showing, by counties, the yield of the fyke-net fisheries of Maine in 1898.

| Species.         | Waldo. |        | Lincoln. |        | Sagadahoc. |        | Cumberland. |        | Total. |        |
|------------------|--------|--------|----------|--------|------------|--------|-------------|--------|--------|--------|
|                  | Lbs.   | Value. | Lbs.     | Value. | Lbs.       | Value. | Lbs.        | Value. | Lbs.   | Value. |
| Shore fisheries: |        |        |          |        |            |        |             |        |        |        |
| Flounders.....   | 6,400  | \$128  |          |        |            |        | 5,400       | \$54   | 11,800 | \$182  |
| Pollock.....     | 3,300  | 13     |          |        |            |        |             |        | 3,300  | 13     |
| Smelt.....       |        |        | 2,000    | \$120  | 2,237      | \$187  |             |        | 4,237  | 307    |
| Sturgeon.....    |        |        |          |        | 1,200      | 4      |             |        | 1,200  | 4      |
| Tomcod.....      | 1,200  | 12     | 500      | 2      | 1,600      | 3      |             |        | 3,300  | 17     |
| Refuse fish..... | 4,200  | 10     |          |        |            |        |             |        | 4,200  | 10     |
| Total.....       | 15,100 | 163    | 2,500    | 122    | 5,037      | 194    | 5,400       | 54     | 28,037 | 533    |

Table showing, by counties, the yield of the pound-net and trap-net fisheries of Maine in 1898.

| Species.         | Washington. |        | Hancock. |        | Waldo. |         | Knox.   |         | Lincoln. |         |
|------------------|-------------|--------|----------|--------|--------|---------|---------|---------|----------|---------|
|                  | Lbs.        | Value. | Lbs.     | Value. | Lbs.   | Value.  | Lbs.    | Value.  | Lbs.     | Value.  |
| Shore fisheries: |             |        |          |        |        |         |         |         |          |         |
| Eels.....        | 3,400       | \$272  |          |        |        |         |         |         |          |         |
| Herring.....     |             |        | 80,000   | \$300  |        |         | 400,080 | \$1,500 | 240,000  | \$1,200 |
| Mackerel.....    |             |        | 8,000    | 100    |        |         | 4,800   | 28      | 40,000   | 200     |
| Pollock.....     |             |        |          |        |        |         |         |         | 10,000   | 100     |
| Salmon.....      |             |        | 765      | 115    | 9,492  | \$1,852 | 1,400   | 265     |          |         |
| Smelt.....       | 6,196       | 682    |          |        |        |         |         |         |          |         |
| Total.....       | 9,596       | 954    | 88,765   | 515    | 9,492  | 1,852   | 406,280 | 1,793   | 290,000  | 1,500   |

| Species.         | Sagadahoc. |        | Cumberland. |        | York.   |        | Total.    |        |
|------------------|------------|--------|-------------|--------|---------|--------|-----------|--------|
|                  | Lbs.       | Value. | Lbs.        | Value. | Lbs.    | Value. | Lbs.      | Value. |
| Shore fisheries: |            |        |             |        |         |        |           |        |
| Butter-fish..... |            |        | 14,800      | \$740  |         |        | 14,800    | \$740  |
| Eels.....        |            |        |             |        |         |        | 3,400     | 272    |
| Herring.....     | 119,000    | \$850  | 386,500     | 2,652  | 30,800  | \$232  | 1,256,380 | 6,734  |
| Mackerel.....    | 30,000     | 1,200  | 59,043      | 2,528  | 84,667  | 2,540  | 226,510   | 6,596  |
| Pollock.....     |            |        | 31,000      | 155    | 3,200   | 40     | 44,200    | 295    |
| Salmon.....      |            |        |             |        | 170     | 43     | 11,827    | 2,275  |
| Shad.....        | 35,800     | 505    | 20,400      | 255    |         |        | 56,200    | 760    |
| Smelt.....       |            |        |             |        |         |        | 6,196     | 682    |
| Total.....       | 184,800    | 2,555  | 511,743     | 6,330  | 118,837 | 2,855  | 1,619,513 | 18,354 |

Table showing, by counties, the yield of the weir fisheries of Maine in 1898.

| Species.            | Hancock.  |         | Penobscot. |        | Waldo. |        | Lincoln.  |        |
|---------------------|-----------|---------|------------|--------|--------|--------|-----------|--------|
|                     | Lbs.      | Value.  | Lbs.       | Value. | Lbs.   | Value. | Lbs.      | Value. |
| Shore fisheries:    |           |         |            |        |        |        |           |        |
| Alewives, fresh...  | 233,300   | \$1,555 | 8,500      | \$57   | 29,100 | \$342  | 79,700    | \$797  |
| Alewives, smoked... | 123,100   | 1,231   |            |        | 32,000 | 448    | 270,200   | 4,200  |
| Herring, fresh....  | 4,843,770 | 19,904  |            |        | 4,800  | 12     | 7,356,120 | 35,487 |
| Mackerel.....       | 200,940   | 1,849   |            |        | 1,000  | 20     | 169,920   | 962    |
| Salmon.....         | 18,975    | 3,796   | 660        | 165    | 9,858  | 1,888  |           |        |
| Shad.....           | 450       | 22      |            |        |        |        | 202,400   | 4,048  |
| Smelt.....          | 14,708    | 1,858   |            |        |        |        | 3,900     | 312    |
| Tomcod.....         | 7,600     | 76      |            |        |        |        |           |        |
| Refuse fish.....    | 2,800     | 28      |            |        |        |        |           |        |
| Total.....          | 5,445,643 | 30,319  | 9,160      | 222    | 76,758 | 2,710  | 8,082,240 | 45,806 |

| Species.            | Washington. |         | Cumberland. |       | Knox.     |        | York.   |       | Total.     |         |
|---------------------|-------------|---------|-------------|-------|-----------|--------|---------|-------|------------|---------|
|                     | Lbs.        | Value.  | Lbs.        | Val.  | Lbs.      | Value. | Lbs.    | Val.  | Lbs.       | Value.  |
| Shore fisheries:    |             |         |             |       |           |        |         |       |            |         |
| Alewives, fresh...  | 25,400      | \$254   |             |       | 10,000    | \$150  |         |       | 386,000    | \$3,155 |
| Alewives, salted... |             |         |             |       | 112,500   | 2,250  |         |       | 112,500    | 2,250   |
| Alewives, smoked... | 7,000       | 140     |             |       | 77,500    | 1,550  |         |       | 509,800    | 7,569   |
| Cod.....            |             |         |             |       |           |        | 50,000  | \$625 | 50,000     | 625     |
| Eels.....           |             |         | 620         | \$49  |           |        |         |       | 620        | 49      |
| Flounders.....      |             |         | 420         | 12    |           |        |         |       | 420        | 12      |
| Herring, fresh....  | 11,685,800  | 34,396  | 32,000      | 229   | 4,071,700 | 15,491 | 26,644  | 400   | 28,020,834 | 105,919 |
| Herring, salted.... | 210,000     | 3,885   |             |       | 8,000     | 200    |         |       | 218,000    | 4,085   |
| Herring, smoked...  | 3,738,500   | 68,005  |             |       |           |        |         |       | 3,738,500  | 68,005  |
| Mackerel.....       | 2,250       | 20      | 4,600       | 184   | 82,000    | 942    | 19,066  | 572   | 479,776    | 4,549   |
| Pollock.....        |             |         |             |       |           |        | 20,000  | 100   | 20,000     | 100     |
| Salmon.....         | 8,448       | 1,286   |             |       | 12        | 2      | 12      | 3     | 37,965     | 7,140   |
| Shad.....           | 2,565       | 51      | 1,600       | 32    |           |        | 2,000   | 50    | 209,015    | 4,203   |
| Smelt.....          | 72,500      | 7,174   | 24,233      | 2,018 |           |        |         |       | 115,341    | 11,362  |
| Tomcod.....         | 3,800       | 34      | 11,250      | 230   |           |        |         |       | 22,650     | 340     |
| Refuse fish.....    |             |         | 32,000      | 160   |           |        |         |       | 34,800     | 188     |
| Total.....          | 15,756,263  | 110,245 | 106,723     | 2,914 | 4,361,712 | 20,585 | 117,722 | 1,750 | 33,956,221 | 214,551 |

# 330 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the catch with dip nets, bag nets, and snap nets in Maine in 1898.

| Species.           | Washington. |        | Hancock. |        | Penobscot. |        | Waldo. |        | Knox.   |        |
|--------------------|-------------|--------|----------|--------|------------|--------|--------|--------|---------|--------|
|                    | Lbs.        | Value. | Lbs.     | Value. | Lbs.       | Value. | Lbs.   | Value. | Lbs.    | Value. |
| Shore fisheries:   |             |        |          |        |            |        |        |        |         |        |
| Alewives, fresh... | 109,800     | \$612  | 5,000    | \$33   |            |        |        |        | 42,275  | \$169  |
| Alewives, salted.. | 25,000      | 250    |          |        |            |        |        |        | 60,600  | 758    |
| Alewives, smoked   | 31,000      | 620    | 6,000    | 60     |            |        |        |        | 60,000  | 600    |
| Flounders.....     |             |        | 2,641    | 54     |            |        | 1,510  | \$30   |         |        |
| Herring.....       | 160,000     | 1,060  |          |        |            |        |        |        |         |        |
| Smelt.....         | 118,300     | 13,906 | 76,726   | 9,830  | 6,400      | \$832  | 40,600 | 5,278  |         |        |
| Tomcod.....        | 112,600     | 1,173  | 7,900    | 98     | 7,000      | 280    | 8,000  | 160    |         |        |
| Refuse fish.....   |             |        | 11,100   | 111    |            |        | 1,900  | 15     |         |        |
| Total.....         | 556,700     | 17,621 | 109,367  | 10,186 | 13,400     | 1,112  | 52,010 | 5,483  | 162,875 | 1,527  |

| Species.            | Lincoln.  |         | Sagadahoc. |        | Cumberland. |         | York. |        | Total.    |         |
|---------------------|-----------|---------|------------|--------|-------------|---------|-------|--------|-----------|---------|
|                     | Lbs.      | Value.  | Lbs.       | Value. | Lbs.        | Value.  | Lbs.  | Value. | Lbs.      | Value.  |
| Shore fisheries:    |           |         |            |        |             |         |       |        |           |         |
| Alewives, fresh ..  | 300,250   | \$3,296 | 7,500      | \$112  |             |         | 4,000 | \$60   | 468,825   | \$4,282 |
| Alewives, salted .. | 788,500   | 5,179   |            |        |             |         |       |        | 874,100   | 6,187   |
| Alewives, smoked    |           |         |            |        |             |         |       |        | 97,000    | 1,280   |
| Cunners.....        |           |         |            |        | 148,300     | \$1,025 |       |        | 148,300   | 1,025   |
| Flounders.....      |           |         |            |        |             |         |       |        | 4,151     | 84      |
| Herring.....        |           |         |            |        |             |         |       |        | 160,000   | 1,060   |
| Smelt.....          | 3,500     | 210     | 19,946     | 1,596  | 800         | 80      |       |        | 266,272   | 31,732  |
| Striped bass.....   |           |         | 450        | 45     |             |         |       |        | 450       | 45      |
| Suckers, smoked     |           |         | 200        | 1      |             |         |       |        | 200       | 1       |
| Tomcod.....         | 1,000     | 3       | 9,900      | 62     | 406         | 8       |       |        | 146,806   | 1,784   |
| Refuse fish.....    |           |         |            |        |             |         |       |        | 13,000    | 126     |
| Total.....          | 1,093,250 | 8,688   | 37,996     | 1,816  | 149,506     | 1,113   | 4,000 | 60     | 2,179,104 | 47,606  |

Table showing, by counties, the yield of the hand and trawl line fisheries of Maine in 1898.

| Species.               | Sagadahoc. |         | Penobscot. |        | Cumberland. |          | Waldo.  |        | York.     |         |
|------------------------|------------|---------|------------|--------|-------------|----------|---------|--------|-----------|---------|
|                        | Lbs.       | Value.  | Lbs.       | Value. | Lbs.        | Value.   | Lbs.    | Value. | Lbs.      | Value.  |
| Vessel fisheries:      |            |         |            |        |             |          |         |        |           |         |
| Cod, fresh.....        | 221,929    | \$4,005 | 14,000     | \$280  | 2,123,187   | \$36,142 | 34,400  | \$798  | 369,575   | \$7,331 |
| Cusk, fresh.....       | 10,643     | 144     |            |        | 228,966     | 2,190    |         |        | 35,547    | 515     |
| Flounders.....         |            |         |            |        |             |          | 2,624   | 62     |           |         |
| Haddock, fresh ..      | 99,088     | 1,837   | 8,000      | 80     | 2,405,701   | 46,858   | 26,500  | 488    | 338,850   | 6,697   |
| Hake, fresh .....      | 98,400     | 984     | 12,500     | 125    | 2,102,079   | 18,761   | 65,750  | 715    | 343,188   | 3,433   |
| Halibut.....           |            |         |            |        | 54,000      | 3,240    | 600     | 48     |           |         |
| Mackerel, fresh        | 1,200      | 180     |            |        |             |          |         |        |           |         |
| Pollock, fresh...      | 3,000      | 21      | 5,300      | 53     | 167,292     | 1,301    | 7,000   | 72     | 36,350    | 286     |
| Livers.....            | 3,440      | 29      |            |        | 133,460     | 1,195    | 1,500   | 11     | 13,140    | 131     |
| Sounds.....            | 1,383      | 63      |            |        | 41,029      | 1,846    | 930     | 45     | 6,760     | 317     |
| Oil.....               | 3,600      | 120     |            |        |             |          |         |        |           |         |
| Total.....             | 442,683    | 7,383   | 39,800     | 538    | 7,255,704   | 111,533  | 139,304 | 2,239  | 1,143,410 | 18,710  |
| Shore fisheries:       |            |         |            |        |             |          |         |        |           |         |
| Cod, fresh.....        | 196,000    | 3,920   |            |        | 1,748,467   | 27,122   | 5,500   | 100    | 987,904   | 16,332  |
| Cod, salted.....       |            |         |            |        | 12,100      | 242      |         |        | 132,200   | 4,407   |
| Cusk, fresh.....       | 3,800      | 50      |            |        | 82,920      | 1,076    |         |        | 9,700     | 138     |
| Cusk, salted.....      |            |         |            |        |             |          |         |        | 6,300     | 99      |
| Eels.....              |            |         |            |        | 9,600       | 768      |         |        | 5,600     | 560     |
| Haddock, fresh ..      | 78,000     | 1,315   |            |        | 1,320,237   | 24,832   | 2,800   | 28     | 713,059   | 11,189  |
| Haddock salted..       |            |         |            |        | 9,000       | 135      |         |        | 20,000    | 400     |
| Hake, fresh.....       | 25,400     | 254     |            |        | 1,785,261   | 17,852   | 12,000  | 120    | 214,100   | 2,185   |
| Hake, salted.....      |            |         |            |        | 10,200      | 82       |         |        | 113,000   | 2,715   |
| Halibut.....           |            |         |            |        |             |          | 200     | 20     |           |         |
| Mackerel.....          |            |         |            |        | 11,488      | 1,020    |         |        | 5,475     | 365     |
| Pollock, fresh...      | 600        | 3       |            |        | 151,010     | 1,079    | 700     | 7      | 64,200    | 778     |
| Pollock, salted ..     |            |         |            |        | 5,745       | 46       |         |        | 10,200    | 82      |
| Smelt.....             | 82,862     | 6,629   |            |        | 13,750      | 1,500    | 6,300   | 756    |           |         |
| Tomcod.....            | 8,600      | 102     |            |        |             |          |         |        |           |         |
| Livers.....            | 1,200      | 12      |            |        | 41,260      | 413      |         |        | 15,540    | 156     |
| Sounds.....            | 400        | 20      |            |        | 33,014      | 1,630    |         |        | 4,919     | 291     |
| Oil.....               | 9,000      | 300     |            |        | 10,080      | 336      |         |        | 3,840     | 125     |
| Total.....             | 405,862    | 12,605  |            |        | 5,249,132   | 78,133   | 27,500  | 1,031  | 2,256,037 | 39,822  |
| Total vessel and shore | 848,545    | 19,988  | 39,800     | 538    | 12,504,836  | 189,666  | 166,804 | 3,270  | 3,399,447 | 58,532  |



Table showing the yield of the hand and trawl line fisheries of Maine in 1898—Continued.

| Species.                      | Washington.      |               | Hancock.         |                | Knox.            |               | Lincoln.         |                | Total.            |                |
|-------------------------------|------------------|---------------|------------------|----------------|------------------|---------------|------------------|----------------|-------------------|----------------|
|                               | Lbs.             | Value.        | Lbs.             | Value.         | Lbs.             | Value.        | Lbs.             | Value.         | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>      |                  |               |                  |                |                  |               |                  |                |                   |                |
| Cod, fresh                    | 75,480           | \$1,891       | 339,249          | \$6,351        | 677,433          | \$8,611       | 904,969          | \$12,675       | 4,760,222         | \$78,084       |
| Cod, salted                   | 143,615          | 3,292         | 3,028,693        | 86,990         | 24,000           | 314           | 742,000          | 25,500         | 3,938,308         | 116,096        |
| Cusk, fresh                   |                  |               | 21,450           | 261            | 339,929          | 3,778         | 200,079          | 2,181          | 836,604           | 9,069          |
| Cusk, salted                  | 20,000           | 340           | 28,469           | 355            |                  |               |                  |                | 48,469            | 695            |
| Flounders                     | 3,200            | 32            | 30,805           | 492            |                  |               |                  |                | 36,629            | 586            |
| Haddock, fresh                | 59,314           | 995           | 207,520          | 3,835          | 333,035          | 1,747         | 557,057          | 9,020          | 4,035,065         | 71,557         |
| Haddock, salted               | 72,365           | 682           | 442,485          | 6,881          |                  |               |                  |                | 514,850           | 7,563          |
| Hake, fresh                   | 37,275           | 366           | 335,240          | 3,604          | 3,339,886        | 22,942        | 1,701,710        | 11,778         | 8,036,028         | 62,708         |
| Hake, salted                  | 147,215          | 1,677         | 1,124,688        | 10,239         |                  |               |                  |                | 1,271,903         | 11,916         |
| Halibut                       | 24,710           | 1,746         | 77,225           | 5,945          | 6,636            | 531           | 2,085            | 166            | 165,256           | 11,676         |
| Mackerel, fresh               |                  |               | 8,700            | 174            | 10,500           | 630           | 1,800            | 108            | 22,200            | 1,092          |
| Mackerel, salted              |                  |               | 15,800           | 1,225          |                  |               |                  |                | 15,800            | 1,225          |
| Pollock, fresh                | 43,760           | 633           | 39,841           | 363            | 92,738           | 409           | 119,073          | 775            | 514,354           | 3,913          |
| Pollock, salted               | 112,645          | 1,314         | 298,611          | 2,603          |                  |               |                  |                | 411,256           | 3,917          |
| Livers                        | 10,000           | 82            | 78,320           | 607            | 176,560          | 1,338         | 29,900           | 244            | 446,320           | 3,637          |
| Sounds                        | 2,450            | 98            | 20,155           | 1,075          | 59,719           | 2,585         | 26,732           | 1,146          | 159,158           | 7,175          |
| Tongues                       | 100              | 3             | 3,945            | 99             |                  |               |                  |                | 4,045             | 102            |
| Oil                           |                  |               | 118,800          | 3,300          |                  |               |                  |                | 122,400           | 3,420          |
| <b>Total</b>                  | <b>752,129</b>   | <b>13,151</b> | <b>6,219,996</b> | <b>134,399</b> | <b>5,060,436</b> | <b>42,885</b> | <b>4,285,405</b> | <b>63,593</b>  | <b>25,338,867</b> | <b>394,431</b> |
| <b>Shore fisheries:</b>       |                  |               |                  |                |                  |               |                  |                |                   |                |
| Cat-fish                      |                  |               |                  |                | 4,000            | 40            |                  |                | 4,000             | 40             |
| Cod, fresh                    | 299,940          | 7,791         | 333,980          | 5,421          | 606,825          | 8,432         | 1,107,000        | 17,804         | 5,235,616         | 86,922         |
| Cod, salted                   | 475,600          | 11,011        | 530,614          | 12,142         | 20,700           | 414           | 93,100           | 1,662          | 1,264,314         | 29,878         |
| Cusk, fresh                   |                  |               | 800              | 12             | 141,148          | 1,411         | 63,229           | 789            | 301,597           | 3,476          |
| Cusk, salted                  | 3,380            | 48            |                  |                | 16,000           | 181           | 12,518           | 187            | 38,198            | 515            |
| Eels                          |                  |               |                  |                |                  |               |                  |                | 15,200            | 1,328          |
| Flounders                     | 9,100            | 91            | 32,517           | 530            |                  |               |                  |                | 41,617            | 621            |
| Haddock, fresh                | 161,700          | 2,837         | 313,835          | 4,166          | 467,603          | 2,285         | 182,610          | 1,773          | 3,239,844         | 48,425         |
| Haddock, salted               | 163,425          | 1,475         | 195,632          | 2,367          | 10,250           | 73            | 43,500           | 356            | 441,807           | 4,806          |
| Hake, fresh                   |                  |               | 331,943          | 3,453          | 1,644,399        | 11,666        | 1,280,768        | 12,320         | 5,293,871         | 47,850         |
| Hake, salted                  | 298,965          | 2,491         | 396,218          | 4,006          | 89,100           | 767           | 226,192          | 1,909          | 1,133,675         | 11,970         |
| Halibut                       | 38,090           | 2,687         | 51,580           | 3,872          | 34,150           | 2,628         | 15,614           | 1,192          | 139,634           | 10,399         |
| Mackerel                      |                  |               |                  |                | 2,400            | 216           | 11,835           | 1,980          | 31,198            | 3,581          |
| Pollock, fresh                | 49,600           | 424           | 42,214           | 432            | 109,664          | 460           | 106,904          | 819            | 524,892           | 4,002          |
| Pollock, salted               | 372,700          | 4,495         | 176,103          | 2,191          | 6,700            | 50            | 20,000           | 120            | 591,448           | 6,984          |
| Smelt                         |                  |               | 223,200          | 26,691         | 26,757           | 2,411         | 219,264          | 15,934         | 577,133           | 53,921         |
| Tomcod                        |                  |               |                  |                | 1,939            | 19            | 23,100           | 231            | 33,639            | 352            |
| Livers                        | 24,600           | 193           | 38,400           | 306            | 81,980           | 603           | 23,500           | 177            | 226,480           | 1,860          |
| Sounds                        | 8,040            | 387           | 14,620           | 586            | 31,985           | 1,351         | 21,906           | 1,204          | 114,884           | 5,469          |
| Tongues                       | 1,260            | 39            | 2,370            | 51             | 200              | 4             |                  |                | 3,830             | 94             |
| Oil                           |                  |               | 1,800            | 50             |                  |               | 10,800           | 360            | 35,520            | 1,171          |
| <b>Total</b>                  | <b>1,906,400</b> | <b>33,969</b> | <b>2,685,826</b> | <b>66,276</b>  | <b>3,295,800</b> | <b>33,011</b> | <b>3,461,840</b> | <b>58,817</b>  | <b>19,288,397</b> | <b>323,664</b> |
| <b>Total vessel and shore</b> | <b>2,658,529</b> | <b>47,120</b> | <b>8,905,822</b> | <b>200,675</b> | <b>8,356,236</b> | <b>75,896</b> | <b>7,747,245</b> | <b>122,410</b> | <b>44,627,264</b> | <b>718,095</b> |

Table showing the catch with spears in Maine in 1898.

| Counties.               | Eels.         |              | Flounders.   |            | Total.        |              |
|-------------------------|---------------|--------------|--------------|------------|---------------|--------------|
|                         | Lbs.          | Value.       | Lbs.         | Value.     | Lbs.          | Value.       |
| <b>Shore fisheries:</b> |               |              |              |            |               |              |
| Hancock                 | 1,600         | \$128        | 9,900        | \$170      | 11,500        | \$298        |
| Knox                    | 4,000         | 400          |              |            | 4,000         | 400          |
| Lincoln                 | 37,900        | 3,078        |              |            | 37,900        | 3,078        |
| Sagadahoc               | 250           | 20           |              |            | 250           | 20           |
| Cumberland              | 42,200        | 3,376        |              |            | 42,200        | 3,376        |
| <b>Total</b>            | <b>85,950</b> | <b>7,002</b> | <b>9,900</b> | <b>170</b> | <b>95,850</b> | <b>7,172</b> |



# 332 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the catch with hoes, rakes, and dredges in Maine in 1898.

| Species.           | Washington. |          | Lincoln.  |          | Sagadahoc. |         | Cumberland. |          | York.   |          |
|--------------------|-------------|----------|-----------|----------|------------|---------|-------------|----------|---------|----------|
|                    | Lbs.        | Value.   | Lbs.      | Value.   | Lbs.       | Value.  | Lbs.        | Value.   | Lbs.    | Value.   |
| Shore fisheries:   |             |          |           |          |            |         |             |          |         |          |
| Clams, fresh.....  | 1,315,200   | \$26,840 | 1,094,290 | \$27,358 | 91,400     | \$2,337 | 2,217,870   | \$81,341 | 375,200 | \$19,110 |
| Clams, salted..... | 108,000     | 2,160    | 32,000    | 670      | .....      | .....   | 289,600     | 6,518    | .....   | .....    |
| Scallops.....      | 4,000       | 400      | 5,529     | 466      | .....      | .....   | 20,615      | 2,170    | .....   | .....    |
| Total.....         | 1,427,200   | 29,400   | 1,131,819 | 28,494   | 91,400     | 2,337   | 2,528,085   | 90,029   | 375,200 | 19,110   |

| Species.               | Hancock.  |         | Waldo. |        | Knox.     |        | Total.    |         |
|------------------------|-----------|---------|--------|--------|-----------|--------|-----------|---------|
|                        | Lbs.      | Value.  | Lbs.   | Value. | Lbs.      | Value. | Lbs.      | Value.  |
| Vessel fisheries:      |           |         |        |        |           |        |           |         |
| Clams, fresh.....      | 47,000    | \$1,175 | 3,000  | \$120  | 3,000     | \$75   | 53,000    | \$1,370 |
| Clams, salted.....     | 83,000    | 1,660   | .....  | .....  | .....     | .....  | 83,000    | 1,660   |
| Scallops.....          | 15,250    | 1,318   | 988    | 78     | .....     | .....  | 16,238    | 1,396   |
| Total.....             | 145,250   | 4,153   | 3,988  | 198    | 3,000     | 75     | 152,238   | 4,426   |
| Shore fisheries:       |           |         |        |        |           |        |           |         |
| Clams, fresh.....      | 1,502,080 | 43,551  | 57,820 | 2,321  | 2,051,940 | 70,657 | 8,705,800 | 273,515 |
| Clams, salted.....     | 181,600   | 37,220  | .....  | .....  | 17,000    | 340    | 628,200   | 46,908  |
| Scallops.....          | 109,345   | 8,999   | 2,707  | 241    | 8,075     | 850    | 150,271   | 13,126  |
| Total.....             | 1,793,025 | 89,770  | 60,527 | 2,562  | 2,077,015 | 71,847 | 9,484,271 | 333,549 |
| Total vessel and shore | 1,938,275 | 93,923  | 64,515 | 2,760  | 2,080,015 | 71,922 | 9,636,509 | 337,975 |

Table showing, by counties, the catch of eels and lobsters with pots in Maine in 1898.

| Species.               | Penobscot. |        | Waldo. |         | Knox.     |          | Lincoln.  |         | Sagadahoc. |         |
|------------------------|------------|--------|--------|---------|-----------|----------|-----------|---------|------------|---------|
|                        | Lbs.       | Value. | Lbs.   | Value.  | Lbs.      | Value.   | Lbs.      | Value.  | Lbs.       | Value.  |
| Vessel fisheries:      |            |        |        |         |           |          |           |         |            |         |
| Lobsters.....          | 1,264      | \$118  | .....  | .....   | 286,688   | \$29,395 | 48,872    | \$4,157 | .....      | .....   |
| Shore fisheries:       |            |        |        |         |           |          |           |         |            |         |
| Eels, fresh.....       | .....      | .....  | .....  | .....   | 1,800     | 144      | .....     | .....   | 39,025     | \$2,947 |
| Lobsters.....          | .....      | .....  | 17,766 | \$1,713 | 2,165,256 | 186,968  | 2,106,645 | 181,617 | 384,900    | 30,392  |
| Total.....             | .....      | .....  | 17,766 | 1,713   | 2,167,056 | 187,112  | 2,106,645 | 181,617 | 423,925    | 33,339  |
| Total vessel and shore | 1,264      | 118    | 17,766 | 1,713   | 2,453,744 | 216,507  | 2,155,517 | 185,774 | 423,925    | 33,339  |

| Species.               | Washington. |         | Hancock.  |         | Cumberland. |         | York.   |         | Total.     |         |
|------------------------|-------------|---------|-----------|---------|-------------|---------|---------|---------|------------|---------|
|                        | Lbs.        | Value.  | Lbs.      | Value.  | Lbs.        | Value.  | Lbs.    | Value.  | Lbs.       | Value.  |
| Vessel fisheries:      |             |         |           |         |             |         |         |         |            |         |
| Eels.....              | .....       | .....   | 7,700     | \$347   | .....       | .....   | .....   | .....   | 7,700      | \$347   |
| Lobsters.....          | 82,809      | \$7,312 | 444,704   | 47,101  | 22,253      | \$2,000 | 21,241  | \$1,841 | 907,831    | 91,924  |
| Total.....             | 82,809      | 7,312   | 452,404   | 47,448  | 22,253      | 2,000   | 21,241  | 1,841   | 915,531    | 92,271  |
| Shore fisheries:       |             |         |           |         |             |         |         |         |            |         |
| Eels, fresh.....       | 4,600       | 948     | 2,316     | 185     | .....       | .....   | .....   | .....   | 47,741     | 3,624   |
| Eels, salted.....      | 3,200       | 320     | .....     | .....   | .....       | .....   | .....   | .....   | 3,200      | 320     |
| Lobsters.....          | 1,545,895   | 132,877 | 2,198,518 | 204,390 | 1,401,338   | 118,616 | 455,145 | 44,358  | 10,275,463 | 900,931 |
| Total.....             | 1,553,695   | 133,545 | 2,200,834 | 204,575 | 1,401,338   | 118,616 | 455,145 | 44,358  | 10,326,404 | 904,875 |
| Total vessel and shore | 1,636,504   | 140,857 | 2,653,238 | 252,023 | 1,423,591   | 120,616 | 476,386 | 46,199  | 11,241,935 | 997,146 |

Table showing, by counties, the catch of sword-fish with harpoons in the vessel fisheries of Maine in 1898.

| Counties.       | Lbs.    | Value.  |
|-----------------|---------|---------|
| Hancock.....    | 35,710  | \$2,500 |
| Knox.....       | 58,547  | 2,815   |
| Cumberland..... | 648,233 | 32,412  |
| York.....       | 135,800 | 6,668   |
| Total.....      | 878,290 | 44,395  |

#### THE SALMON FISHERY OF THE PENOBSCOT RIVER AND BAY.

The principal salmon fishery on the Atlantic seaboard is centered upon the Penobscot River and bay. During the progress of the last canvass data were secured to show the condition of the fishery during the years 1897, 1898, and 1899. As data for the years 1895 and 1896 had been secured previously, the whole has been combined in the three following tables in order to show in a condensed form, by townships, the status of the fishery during each of the years named. As the fishery has been prosecuted on the river for a number of years by people owning the shore line, naturally but slight changes are noted in the number of persons employed and the weirs and traps used. In 1895, 133 persons were employed, while 102 were engaged in 1899. In 1895, 193 weirs and traps were used, while 167 were employed in 1899. Gill nets occupy a very insignificant position in this fishery, only 12 being used in 1899. The total investment in the fishery in 1895 was \$16,268, while in 1899 it was \$14,392. The catch from year to year has fluctuated considerably. In 1895, 4,395 salmon were taken, while 3,515 were secured in 1899. The highest catch was in 1896, when 6,403 salmon were secured.

Persons employed in the salmon fishery of Penobscot River and Bay.

| Towns.                            | 1895. | 1896. | 1897. | 1898. | 1899. |
|-----------------------------------|-------|-------|-------|-------|-------|
| Brooksville (Cape Rosier).....    | 4     | 2     | 2     | 2     | 2     |
| Bucksport.....                    | 10    | 9     | 9     | 9     | 9     |
| Camden.....                       | 2     | 2     | 3     | 3     | 1     |
| Castine.....                      | 3     | 2     | 4     | 4     | 4     |
| Hampden.....                      | 1     | 1     | 1     | 1     | 1     |
| Islesboro.....                    | 7     | 6     | 3     | 4     | 4     |
| Lincolnville.....                 | 7     | 7     | 4     | 4     | 5     |
| Matinicus and Ragged Islands..... | 4     | 8     | 4     | 2     | 2     |
| Northport.....                    | 7     | 6     | 4     | 2     | 2     |
| Orland.....                       | 17    | 22    | 11    | 12    | 12    |
| Orrington.....                    | 5     | 5     | 3     | 3     | 3     |
| Penobscot.....                    | 16    | 15    | 15    | 15    | 17    |
| Searsport.....                    | 3     | 2     | 2     | 2     | 1     |
| South Brewer.....                 | 2     | 2     | 1     | 1     | 3     |
| Stockton and Prospect.....        | 17    | 15    | 15    | 15    | 15    |
| Verona.....                       | 21    | 21    | 18    | 19    | 19    |
| Winterport.....                   | 7     | 8     | 2     | 2     | 2     |
| Bangor.....                       |       |       | 2     | 2     |       |
| Total.....                        | 133   | 133   | 103   | 102   | 102   |

*Apparatus, boats, etc., employed in the salmon fishery of Penobscot River and Bay.*

| Apparatus and towns.            | 1895. |        | 1896. |        | 1897. |        | 1898. |        | 1899. |        |
|---------------------------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
|                                 | No.   | Value. | No.   | Value. | No.   | Value. | No.   | Value. | No.   | Value. |
| <i>Weirs and traps.</i>         |       |        |       |        |       |        |       |        |       |        |
| Brooksville (Cape Rosier) . . . | 7     | \$420  | 4     | \$240  | 4     | \$300  | 4     | \$300  | 4     | \$300  |
| Bucksport . . . . .             | 13    | 511    | 11    | 455    | 11    | 490    | 13    | 640    | 11    | 490    |
| Camden . . . . .                | 5     | 200    | 5     | 200    | 7     | 380    | 7     | 380    | 3     | 165    |
| Castine . . . . .               | 4     | 252    | 3     | 201    | 6     | 525    | 5     | 425    | 5     | 425    |
| Islesboro . . . . .             | 17    | 925    | 16    | 875    | 12    | 600    | 16    | 800    | 18    | 900    |
| Lincolnville . . . . .          | 12    | 650    | 14    | 700    | 14    | 700    | 14    | 700    | 18    | 900    |
| Matinicus and Ragged Islands    | 1     | 1,000  | 2     | 2,500  | 2     | 1,600  | 1     | 800    | 1     | 800    |
| Northport . . . . .             | 15    | 1,155  | 12    | 1,005  | 9     | 475    | 8     | 400    | 8     | 400    |
| Orland . . . . .                | 19    | 664    | 26    | 888    | 13    | 780    | 15    | 930    | 15    | 930    |
| Orrington . . . . .             | 2     | 99     | 2     | 99     | 3     | 150    | 3     | 150    | 3     | 150    |
| Penobscot . . . . .             | 24    | 1,587  | 22    | 1,421  | 19    | 1,350  | 18    | 1,290  | 20    | 1,390  |
| Searsport . . . . .             | 4     | 213    | 3     | 152    | 4     | 400    | 4     | 400    | 3     | 300    |
| Stockton and Prospect . . .     | 26    | 1,580  | 20    | 1,183  | 20    | 1,590  | 21    | 1,730  | 22    | 1,750  |
| Verona . . . . .                | 37    | 2,801  | 37    | 2,760  | 37    | 2,365  | 37    | 2,455  | 34    | 2,210  |
| Winterport . . . . .            | 7     | 467    | 7     | 467    | 3     | 200    | 3     | 200    | 2     | 150    |
| Total . . . . .                 | 193   | 12,474 | 184   | 13,146 | 164   | 11,905 | 169   | 11,600 | 167   | 11,260 |
| <i>Gill nets.</i>               |       |        |       |        |       |        |       |        |       |        |
| Hampden . . . . .               | 2     | 26     | 2     | 26     | 2     | 60     | 2     | 60     | 2     | 60     |
| Orrington . . . . .             | 5     | 58     | 5     | 58     | 4     | 60     | 4     | 60     | 4     | 60     |
| South Brewer . . . . .          | 3     | 105    | 3     | 105    | 3     | 115    | 3     | 115    | 6     | 235    |
| Winterport . . . . .            |       |        | 1     | 10     |       |        |       |        |       |        |
| Bangor . . . . .                |       |        |       |        | 3     | 90     | 3     | 90     |       |        |
| Total . . . . .                 | 10    | 189    | 11    | 199    | 12    | 325    | 12    | 325    | 12    | 355    |
| <i>Boats, scows, and rafts.</i> |       |        |       |        |       |        |       |        |       |        |
| Brooksville (Cape Rosier) . . . | 3     | 30     | 2     | 20     | 2     | 30     | 2     | 30     | 2     | 30     |
| Bucksport . . . . .             | 16    | 270    | 14    | 238    | 16    | 232    | 16    | 232    | 16    | 232    |
| Camden . . . . .                | 2     | 45     | 2     | 45     | 3     | 35     | 3     | 35     | 1     | 15     |
| Castine . . . . .               | 5     | 25     | 4     | 20     | 10    | 76     | 10    | 76     | 10    | 86     |
| Hampden . . . . .               | 1     | 12     | 1     | 12     | 1     | 8      | 1     | 8      | 1     | 8      |
| Islesboro . . . . .             | 7     | 94     | 6     | 79     | 3     | 55     | 4     | 85     | 5     | 100    |
| Lincolnville . . . . .          | 7     | 132    | 7     | 117    | 4     | 100    | 4     | 100    | 5     | 122    |
| Matinicus and Ragged Islands    | 2     | 75     | 5     | 195    | 4     | 100    | 2     | 80     | 2     | 80     |
| Northport . . . . .             | 8     | 163    | 7     | 138    | 4     | 90     | 2     | 50     | 2     | 50     |
| Orland . . . . .                | 25    | 467    | 32    | 535    | 13    | 121    | 14    | 131    | 14    | 131    |
| Orrington . . . . .             | 2     | 11     | 2     | 11     | 5     | 85     | 5     | 85     | 5     | 85     |
| Penobscot . . . . .             | 30    | 436    | 28    | 413    | 33    | 589    | 33    | 589    | 37    | 654    |
| Searsport . . . . .             | 6     | 145    | 4     | 125    | 4     | 95     | 4     | 95     | 3     | 75     |
| South Brewer . . . . .          | 1     | 6      | 1     | 6      | 1     | 5      | 1     | 5      | 2     | 10     |
| Stockton and Prospect . . .     | 33    | 413    | 31    | 383    | 25    | 366    | 28    | 441    | 27    | 426    |
| Verona . . . . .                | 35    | 1,100  | 36    | 1,110  | 31    | 503    | 35    | 608    | 35    | 608    |
| Winterport . . . . .            | 10    | 181    | 11    | 189    | 6     | 65     | 6     | 65     | 6     | 65     |
| Bangor . . . . .                |       |        |       |        | 1     | 5      | 1     | 5      |       |        |
| Total . . . . .                 | 193   | 3,605  | 193   | 3,636  | 166   | 2,560  | 171   | 2,720  | 173   | 2,777  |

| Towns.                              | Total investment. |        |        |        |        |
|-------------------------------------|-------------------|--------|--------|--------|--------|
|                                     | 1895.             | 1896.  | 1897.  | 1898.  | 1899.  |
| Brooksville (Cape Rosier) . . . . . | \$450             | \$260  | \$330  | \$330  | \$330  |
| Bucksport . . . . .                 | 781               | 693    | 722    | 872    | 722    |
| Camden . . . . .                    | 245               | 245    | 415    | 415    | 180    |
| Castine . . . . .                   | 277               | 221    | 601    | 501    | 511    |
| Hampden . . . . .                   | 38                | 38     | 68     | 68     | 68     |
| Islesboro . . . . .                 | 1,019             | 954    | 655    | 885    | 1,000  |
| Lincolnville . . . . .              | 782               | 817    | 800    | 800    | 1,022  |
| Matinicus and Ragged Islands . . .  | 1,075             | 2,695  | 1,700  | 880    | 880    |
| Northport . . . . .                 | 1,318             | 1,143  | 565    | 450    | 450    |
| Orland . . . . .                    | 1,131             | 1,423  | 901    | 1,061  | 1,061  |
| Orrington . . . . .                 | 168               | 168    | 295    | 295    | 295    |
| Penobscot . . . . .                 | 2,023             | 1,834  | 1,939  | 1,879  | 2,044  |
| Searsport . . . . .                 | 358               | 277    | 495    | 495    | 375    |
| South Brewer . . . . .              | 111               | 111    | 120    | 120    | 245    |
| Stockton and Prospect . . . . .     | 1,943             | 1,566  | 1,956  | 2,171  | 2,176  |
| Verona . . . . .                    | 3,901             | 3,870  | 2,868  | 3,063  | 2,818  |
| Winterport . . . . .                | 648               | 666    | 265    | 265    | 215    |
| Bangor . . . . .                    |                   |        | 95     | 95     |        |
| Total . . . . .                     | 16,268            | 16,981 | 14,790 | 14,645 | 14,392 |

NOTE.—The value of accessories is included with that of apparatus.

*Catch of salmon in the Penobscot River and Bay.*

| Towns.                             | 1895. |        |        | 1896. |        |        | 1897. |        |        |
|------------------------------------|-------|--------|--------|-------|--------|--------|-------|--------|--------|
|                                    | No.   | Lbs.   | Value. | No.   | Lbs.   | Value. | No.   | Lbs.   | Value. |
| Brooksville (Cape Rosier) .....    | 163   | 2,092  | \$283  | 146   | 1,626  | \$190  | 24    | 360    | \$72   |
| Bucksport .....                    | 205   | 2,885  | 448    | 245   | 2,729  | 471    | 179   | 2,327  | 349    |
| Camden .....                       | 64    | 964    | 136    | 71    | 990    | 139    | 151   | 1,963  | 294    |
| Castine .....                      | 77    | 1,150  | 207    | 93    | 1,166  | 156    | 120   | 1,440  | 288    |
| Hampden .....                      | 30    | 510    | 102    | 32    | 448    | 90     | 21    | 270    | 49     |
| Islesboro .....                    | 474   | 6,551  | 1,042  | 643   | 8,265  | 1,313  | 295   | 4,720  | 944    |
| Lincolntonville .....              | 205   | 3,240  | 583    | 297   | 3,503  | 525    | 302   | 3,926  | 589    |
| Matinicus and Ragged Islands ..... | 65    | 780    | 109    | 182   | 1,627  | 175    | 174   | 1,740  | 174    |
| Northport .....                    | 286   | 4,066  | 697    | 418   | 5,401  | 810    | 154   | 2,002  | 310    |
| Orland .....                       | 78    | 1,077  | 202    | 152   | 1,802  | 306    | 88    | 1,144  | 194    |
| Orrington .....                    | 65    | 1,101  | 165    | 82    | 1,150  | 161    | 74    | 1,062  | 160    |
| Penobscot .....                    | 485   | 7,270  | 1,313  | 959   | 12,483 | 1,992  | 536   | 6,968  | 1,185  |
| Searsport .....                    | 458   | 7,278  | 1,456  | 426   | 5,112  | 818    | 239   | 2,868  | 373    |
| South Brewer .....                 | 63    | 1,071  | 161    | 170   | 2,380  | 309    | 39    | 390    | 70     |
| Stockton and Prospect .....        | 629   | 10,067 | 1,713  | 829   | 10,471 | 1,590  | 570   | 7,289  | 915    |
| Verona .....                       | 908   | 12,555 | 2,337  | 1,421 | 17,761 | 3,172  | 889   | 11,557 | 1,734  |
| Winterport .....                   | 140   | 2,354  | 402    | 237   | 3,311  | 499    | 98    | 1,176  | 153    |
| Bangor .....                       |       |        |        |       |        |        | 32    | 320    | 58     |
| Total .....                        | 4,395 | 65,011 | 11,356 | 6,403 | 80,225 | 12,716 | 3,985 | 51,522 | 7,911  |

| Towns.                             | 1898. |        |        | 1899. |        |        |
|------------------------------------|-------|--------|--------|-------|--------|--------|
|                                    | No.   | Lbs.   | Value. | No.   | Lbs.   | Value. |
| Brooksville (Cape Rosier) .....    | 45    | 765    | \$115  | 39    | 585    | \$129  |
| Bucksport .....                    | 158   | 2,054  | 411    | 153   | 1,989  | 498    |
| Camden .....                       | 111   | 1,388  | 263    | 67    | 871    | 174    |
| Castine .....                      | 122   | 1,464  | 293    | 146   | 1,898  | 380    |
| Hampden .....                      | 24    | 312    | 62     | 4     | 52     | 13     |
| Islesboro .....                    | 326   | 4,890  | 978    | 269   | 4,035  | 1,009  |
| Lincolntonville .....              | 229   | 2,977  | 566    | 454   | 5,902  | 1,180  |
| Matinicus and Ragged Islands ..... | 28    | 280    | 28     | 38    | 380    | 38     |
| Northport .....                    | 130   | 1,625  | 309    | 188   | 2,444  | 489    |
| Orland .....                       | 65    | 845    | 169    | 62    | 806    | 202    |
| Orrington .....                    | 59    | 855    | 204    | 50    | 724    | 181    |
| Penobscot .....                    | 468   | 6,084  | 1,217  | 534   | 6,942  | 1,736  |
| Searsport .....                    | 197   | 2,627  | 565    | 221   | 2,707  | 593    |
| South Brewer .....                 | 36    | 360    | 72     | 61    | 610    | 153    |
| Stockton and Prospect .....        | 452   | 6,016  | 1,089  | 512   | 6,456  | 1,344  |
| Verona .....                       | 656   | 8,528  | 1,706  | 672   | 8,736  | 2,184  |
| Winterport .....                   | 90    | 1,200  | 228    | 45    | 551    | 121    |
| Bangor .....                       | 29    | 290    | 67     |       |        |        |
| Total .....                        | 3,225 | 42,560 | 8,342  | 3,515 | 45,688 | 10,424 |

## THE CANNING INDUSTRY.

The canning of herring and other species is the most important shore industry connected with the fisheries of Maine. The principal feature of the business in most of the canneries is the preparation of small herring as sardines. Clams are canned extensively, and plain herring, mackerel, and menhaden in limited quantities incidentally. In a few instances smoked and pickled herring also form a part of the output. When not preparing fishery products a number of the canneries engage in canning fruit and vegetables in their season. The canning of lobsters was formerly an important part of the business, but in 1895 the State enacted a law prohibiting the catching of lobsters under 10½ inches in length. The large lobsters being too expensive for canning purposes, that branch of the industry was discontinued. The number of lobster canneries had, however, been gradually decreasing for years, the packers finding it more profitable to locate their canneries in the British provinces, where the supply of lobsters was more constant and labor much cheaper than in Maine.

In 1889 there were 49 sardine and other canneries in operation,

employing 4,017 persons, while in 1898 there were 78 canneries, with 6,829 employees. There has been a considerable increase in the pack of sardines. In 1889 the sardines packed were valued at \$1,676,105, and in 1898 the value of the pack was \$3,103,723. There were no mackerel canned in 1889, but in 1898 the pack of canned mackerel was valued at \$44,848. There has also been an increase in the value of the pack of canned clams from \$43,050 in 1889 to \$206,087 in 1898.

There has recently been considerable change in the management of the sardine industry. In 1899 two companies were formed which included a large majority of the sardine canneries of the State, and the result has apparently been favorable to the interests of the business.

*Table showing, by counties, the canneries, cash capital, cost of materials, wages paid, and number of persons employed in the canning industry of Maine in 1898.*

| Counties.       | Canneries. |           | Cash capital. | Cost of materials. | Wages paid. | Persons employed. |
|-----------------|------------|-----------|---------------|--------------------|-------------|-------------------|
|                 | No.        | Value.    |               |                    |             |                   |
| Washington..... | 51         | \$397,000 | \$669,850     | \$1,322,865        | \$813,251   | 5,435             |
| Hancock.....    | 10         | 64,200    | 100,000       | 111,696            | 82,922      | 727               |
| Knox.....       | 4          | 6,800     | 18,500        | 11,792             | 7,480       | 113               |
| Lincoln.....    | 5          | 58,800    | 105,000       | 96,756             | 62,974      | 407               |
| Cumberland..... | 8          | 39,500    | 21,500        | 18,650             | 21,080      | 147               |
| Total.....      | 78         | 566,300   | 914,850       | 1,561,759          | 987,707     | 6,829             |

*Table showing, by counties, the products of the canning industry of Maine in 1898.*

| Products.   | Knox.   |        | Lincoln.  |          | Cumberland. |         |
|---|---------|--------|-----------|----------|-------------|---------|
|   | No.     | Value. | No.       | Value.   | No.         | Value.  |
| Raw products:                                     |         |        |           |          |             |         |
| Herring.....pounds.....                           |         |        | 4,188,000 | \$14,040 | 273,700     | \$1,369 |
| Mackerel.....do.....                              |         |        | 45,900    | 230      | 10,000      | 50      |
| Menhaden.....do.....                              | 202,200 | \$708  |           |          |             |         |
| Clams.....bushels.....                            | 58,890  | 17,862 | 24,855    | 6,490    | 54,257      | 18,260  |
| Total.....  |         | 18,570 |           | 20,760   |             | 19,679  |
| Manufactured products:                            |         |        |           |          |             |         |
| Sardines in oil—                                  |         |        |           |          |             |         |
| Quarters.....cases.....                           |         |        | 24,400    | 64,080   |             |         |
| Halves.....do.....                                |         |        | 6,500     | 25,800   |             |         |
| Sardines in mustard—                              |         |        |           |          |             |         |
| Quarters.....do.....                              |         |        | 5,100     | 16,775   |             |         |
| Three-quarters.....do.....                        |         |        | 23,700    | 68,050   |             |         |
| Sardines in spices—                               |         |        |           |          |             |         |
| Three-quarters.....do.....                        |         |        | 750       | 2,063    |             |         |
| Plain herring—                                    |         |        |           |          |             |         |
| One pound.....do.....                             |         |        | 500       | 1,125    | 3,405       | 10,596  |
| Mackerel—   |         |        |           |          |             |         |
| Three-quarters.....do.....                        |         |        | 610       | 2,440    |             |         |
| One pound.....do.....                             |         |        | 100       | 550      | 100         | 280     |
| Menhaden—   |         |        |           |          |             |         |
| One pound.....do.....                             | 1,896   | 4,929  |           |          |             |         |
| Clams—  |         |        |           |          |             |         |
| One pound.....do.....                             | 8,871   | 23,255 | 6,060     | 15,383   | 12,334      | 35,710  |
| Two pound.....do.....                             | 7,992   | 15,185 | 200       | 400      | 1,781       | 3,562   |
| Clam juice—                                       |         |        |           |          |             |         |
| One pound.....do.....                             |         |        |           |          | 600         | 1,380   |
| Two pound.....do.....                             | 7,917   | 15,834 |           |          | 200         | 320     |
| Clam chowder—                                     |         |        |           |          |             |         |
| Three pound.....do.....                           | 200     | 500    | 300       | 840      | 9,070       | 24,956  |
| Total.....  |         | 59,703 |           | 197,506  |             | 76,803  |
| Secondary products:                               |         |        |           |          |             |         |
| Oil.....gallons.....                              |         |        | 2,784     | 725      |             |         |
| Pomace.....tons.....                              |         |        | 184       | 1,104    |             |         |
| Total.....  |         |        |           | 1,829    |             |         |
| Total of manufactured and secondary products..... |         | 59,703 |           | 199,335  |             | 76,803  |

Table showing the products of the canning industry of Maine in 1898—Continued.

| Products.  | Washington.  |             | Hancock.    |           | Total.       |             |
|--|--------------|-------------|-------------|-----------|--------------|-------------|
|  | No.          | Value.      | No.         | Value.    | No.          | Value.      |
| <b>Raw products:</b>                                     |              |             |             |           |              |             |
| Herring .....pounds..                                    | 57, 570, 100 | \$269, 009  | 3, 690, 300 | \$14, 736 | 65, 722, 100 | \$299, 154  |
| Mackerel .....do.....                                    | 45, 070      | 160         | 471, 200    | 3, 158    | 572, 170     | 3, 598      |
| Menhaden .....do.....                                    |              |             |             |           | 202, 200     | 708         |
| Clams .....bushels..                                     | 3, 543       | 711         | 37, 386     | 9, 205    | 178, 931     | 52, 528     |
| <b>Total.....</b>  |              | 269, 880    |             | 27, 099   |              | 355, 988    |
| <b>Manufactured products:</b>                            |              |             |             |           |              |             |
| <b>Sardines in oil—</b>                                  |              |             |             |           |              |             |
| Quarters .....cases..                                    | 810, 988     | 2, 072, 714 | 23, 573     | 80, 581   | 858, 961     | 2, 217, 375 |
| Halves .....do.....                                      | 140          | 560         | 194         | 970       | 6, 834       | 27, 330     |
| <b>Sardines in mustard—</b>                              |              |             |             |           |              |             |
| Quarters .....do.....                                    | 30, 476      | 82, 386     | 4, 768      | 18, 140   | 40, 344      | 117, 301    |
| Three-quarters .....do.....                              | 232, 195     | 555, 596    | 34, 654     | 99, 127   | 290, 549     | 722, 773    |
| <b>Sardines in spices—</b>                               |              |             |             |           |              |             |
| Quarters .....do.....                                    | 1, 000       | 4, 188      | 108         | 351       | 1, 108       | 4, 539      |
| Three-quarters .....do.....                              | 800          | 2, 600      | 873         | 2, 307    | 2, 423       | 6, 970      |
| <b>Sardines in tomato sauce—</b>                         |              |             |             |           |              |             |
| Quarters .....do.....                                    |              |             | 438         | 1, 435    | 438          | 1, 435      |
| Three-quarters .....do.....                              | 1, 000       | 3, 000      |             |           | 1, 000       | 3, 000      |
| <b>Sardines soured—</b>                                  |              |             |             |           |              |             |
| Three-quarters .....do.....                              | 1, 000       | 3, 000      |             |           | 1, 000       | 3, 000      |
| <b>Brook trout (herring)—</b>                            |              |             |             |           |              |             |
| One pound .....do.....                                   |              |             | 357         | 1, 428    | 357          | 1, 428      |
| Two pound .....do.....                                   |              |             | 71          | 249       | 71           | 249         |
| Three pound .....do.....                                 |              |             | 71          | 284       | 71           | 284         |
| <b>Plain herring—</b>                                    |              |             |             |           |              |             |
| One pound .....do.....                                   | 1, 100       | 3, 080      |             |           | 5, 005       | 14, 800     |
| <b>Mackerel—</b>   |              |             |             |           |              |             |
| Three-quarters .....do.....                              | 740          | 2, 960      | 1, 957      | 7, 371    | 3, 307       | 12, 771     |
| One pound .....do.....                                   | 13           | 42          | 5, 192      | 28, 556   | 5, 405       | 29, 428     |
| Two pound .....do.....                                   |              |             | 450         | 2, 025    | 450          | 2, 025      |
| Three pound .....do.....                                 |              |             | 104         | 624       | 104          | 624         |
| <b>Menhaden—</b>   |              |             |             |           |              |             |
| One pound .....do.....                                   |              |             |             |           | 1, 896       | 4, 929      |
| <b>Russian sardines.....barrels..</b>                    | 200          | 750         | 2, 000      | 7, 000    | 2, 200       | 7, 750      |
| <b>Pickled herring .....do.....</b>                      | 4, 850       | 16, 995     |             |           | 4, 850       | 16, 995     |
| <b>Smoked herring—</b>                                   |              |             |             |           |              |             |
| Bloaters .....boxes..                                    | 23, 753      | 9, 588      |             |           | 23, 753      | 9, 588      |
| Medium, etc. ....do.....                                 | 363, 919     | 32, 753     |             |           | 363, 919     | 32, 753     |
| <b>Clams—</b>  |              |             |             |           |              |             |
| One pound .....cases..                                   | 4, 650       | 15, 892     | 12, 301     | 37, 560   | 44, 216      | 127, 800    |
| Two pound .....do.....                                   |              |             | 2, 400      | 6, 000    | 12, 373      | 25, 147     |
| <b>Clam juice—</b>                                       |              |             |             |           |              |             |
| One-quarter-pint .....do.....                            | 250          | 1, 000      |             |           | 250          | 1, 000      |
| One pound .....do.....                                   | 1, 000       | 3, 000      |             |           | 1, 600       | 4, 380      |
| Two pound .....do.....                                   |              |             |             |           | 8, 117       | 16, 154     |
| One gallon .....do.....                                  | 100          | 300         |             |           | 100          | 300         |
| <b>Clam chowder—</b>                                     |              |             |             |           |              |             |
| Three pound .....do.....                                 |              |             | 1, 550      | 4, 610    | 11, 120      | 30, 906     |
| <b>Clam extract—</b>                                     |              |             |             |           |              |             |
| Eight ounce .....do.....                                 |              |             | 200         | 400       | 200          | 400         |
| <b>Total.....</b>  |              | 2, 810, 404 |             | 299, 018  |              | 3, 443, 434 |
| <b>Secondary products:</b>                               |              |             |             |           |              |             |
| Oil .....gallons..                                       | 9, 888       | 1, 391      |             |           | 12, 672      | 2, 116      |
| Pomace .....tons.....                                    | 601          | 4, 806      |             |           | 785          | 5, 910      |
| Scrap .....barrels..                                     | 31, 214      | 2, 328      |             |           | 31, 214      | 2, 328      |
| <b>Total.....</b>  |              | 8, 525      |             |           |              | 10, 354     |
| <b>Total of manufactured and secondary products.....</b> |              | 2, 818, 929 |             | 299, 018  |              | 3, 453, 788 |

Number of canneries engaged in each branch of canning in Maine in 1898.

| Counties.         | Sardine. | Herring. | Mackerel. | Menhaden. | Clam. | Total.* |
|-------------------|----------|----------|-----------|-----------|-------|---------|
| Washington.....   | 50       | 1        | 9         |           | 2     | 51      |
| Hancock.....      | 7        | 1        | 4         |           | 4     | 10      |
| Knox.....         |          |          |           | 1         | 3     | 4       |
| Lincoln.....      | 4        | 1        | 3         |           | 3     | 5       |
| Cumberland.....   |          | 3        | 1         |           | 7     | 8       |
| <b>Total.....</b> | 61       | 6        | 17        | 1         | 19    | 78      |

\* Number of canneries in each county without duplication.



## WHOLESALE FISH TRADE AND SMOKED-FISH INDUSTRY.

The wholesale trade in fishery products, and the preparation of smoked herring and haddock, the latter being known as "Finnan haddie," are of considerable importance in many of the fishing localities on the coast of Maine. The fishery trade, though widely distributed, is centered chiefly at Portland, in Cumberland County, and at Rockland and Vinal Haven, in Knox County. The fish sold in a salted condition are purchased from fishermen fresh, and afterwards cured by dealers, or salted on board vessels before landing. Fresh fish, lobsters, clams, scallops, and a variety of secondary products are also handled extensively. The greater part of the pack of "Finnan haddie" is prepared at Portland, while the smoking of herring is carried on principally at Eastport and Lubec, in Washington County.

In 1898, exclusive of fishermen and sardine canners who prepare considerable quantities of smoked and pickled herring and Russian sardines, there were 124 firms, employing 748 persons in these two branches of industry. Their shore property was valued at \$271,570. The cost of materials utilized in the preparation of fishery products was \$89,645. The wages paid to employees aggregated \$112,449, and the cash capital employed in the business amounted to \$410,625. The products of the wholesale trade were valued at \$1,899,191, and those prepared in connection with the smoked-fish industry at \$154,992.

*Table showing the number of firms, investment, wages, and persons employed in the wholesale fishery trade and smoked-fish industry of Maine in 1898.*

| Counties.                  | No. of firms. | Value of shore property. | *Cost of materials. | Cash capital. | Wages.   | Persons employed. |
|----------------------------|---------------|--------------------------|---------------------|---------------|----------|-------------------|
| Washington.....            | 53            | \$35,815                 | \$34,166            | \$39,650      | \$20,937 | 324               |
| Hancock.....               | 12            | 14,160                   | 8,875               | 32,200        | 6,502    | 60                |
| Knox.....                  | 14            | 73,425                   | 16,421              | 76,100        | 22,966   | 128               |
| Lincoln and Sagadahoc..... | 8             | 3,200                    | 4,445               | 7,000         | 5,840    | 48                |
| Cumberland.....            | 34            | 136,570                  | 25,353              | 245,600       | 54,765   | 178               |
| York.....                  | 3             | 3,400                    | 385                 | 10,075        | 1,439    | 10                |
| Total.....                 | 124           | 271,570                  | 89,645              | 410,625       | 112,449  | 748               |

\*Includes salt, ice, wood, etc.

*Table showing the products of the smoked-fish industry of Maine in 1898.*

| Products.                     | Washington. |          | Knox. |      | Lincoln. |         | Cumberland. |          | Total.    |          |
|-------------------------------|-------------|----------|-------|------|----------|---------|-------------|----------|-----------|----------|
|                               | No.         | Value.   | No.   | Val. | No.      | Val.    | No.         | Value.   | No.       | Value.   |
| Raw products:                 |             |          |       |      |          |         |             |          |           |          |
| Haddock.....lbs.....          |             |          | 2,500 | \$25 |          |         | 1,285,000   | \$22,113 | 1,287,500 | \$22,138 |
| Herring.....do.....           | 7,668,500   | \$25,987 |       |      | 912,000  | \$3,625 |             |          | 8,580,500 | 29,612   |
| Total.....                    | 7,668,500   | 25,987   | 2,500 | 25   | 912,000  | 3,625   | 1,285,000   | 22,113   | 9,868,000 | 51,750   |
| Manufactured products:        |             |          |       |      |          |         |             |          |           |          |
| Smoked haddock—               |             |          |       |      |          |         |             |          |           |          |
| Finnan haddie.....lbs.....    |             |          | 2,000 | 80   |          |         | 800,000     | 36,000   | 802,000   | 36,080   |
| Smoked herring—               |             |          |       |      |          |         |             |          |           |          |
| Bloaters.....boxes.....       | 6,900       | 3,450    |       |      |          |         |             |          | 6,900     | 3,450    |
| Medium, etc.....do.....       | 748,150     | 67,344   |       |      | 121,200  | 9,696   |             |          | 869,350   | 77,040   |
| Pickled herring.....bbls..... | 9,150       | 35,572   |       |      |          |         |             |          | 9,150     | 35,572   |
| Russian sardines.....do.....  | 950         | 2,850    |       |      |          |         |             |          | 950       | 2,850    |
| Total value.....              |             | 109,216  |       | 80   |          | 9,696   |             | 36,000   |           | 154,992  |

Table showing the quantity and selling value of the products handled in the wholesale fishery trade of Maine in 1898.

| Products.                        | Washington. |           | Hancock.    |          | Sagadahoc. |          | Lincoln. |           |
|----------------------------------|-------------|-----------|-------------|----------|------------|----------|----------|-----------|
|                                  | Lbs.        | Value.    | Lbs.        | Value.   | Lbs.       | Value.   | Lbs.     | Value.    |
| Fish, fresh .....                |             |           | 210, 915    | \$4, 999 |            |          |          |           |
| Fish, salted .....               | 870, 800    | \$19, 915 | 2, 214, 751 | 59, 659  | 100, 000   | \$3, 000 | 792, 800 | \$12, 160 |
| Fish, pickled .....              | 37, 000     | 861       |             |          |            |          |          |           |
| Smoked herring, boneless .....   |             |           | 63, 750     | 5, 626   |            |          |          |           |
| Sounds, green .....              |             |           |             |          |            |          | 10, 000  | 440       |
| Sounds, dried .....              | 1, 134      | 243       | 12, 014     | 2, 581   |            |          |          |           |
| Tongues, dried .....             | 1, 200      | 41        | 4, 685      | 187      |            |          | 1, 200   | 48        |
| Oil .....                        | 4, 584      | 1, 127    | 10, 058     | 2, 967   |            |          | 8, 400   | 2, 450    |
| Clam meat, fresh, barrels .....  |             |           | 375         | 2, 063   |            |          |          |           |
| Clam meat, salted, barrels ..... | 440         | 2, 310    | 3, 190      | 15, 950  |            |          |          |           |
| Total .....                      |             | 24, 497   |             | 94, 032  |            | 3, 000   |          | 15, 098   |

| Products.                        | Knox.       |           | Cumberland.  |             | York.    |           | Total.       |             |
|----------------------------------|-------------|-----------|--------------|-------------|----------|-----------|--------------|-------------|
|                                  | Lbs.        | Value.    | Lbs.         | Value.      | Lbs.     | Value.    | Lbs.         | Value.      |
| Fish, fresh .....                | 960, 510    | \$32, 921 | 16, 208, 343 | \$341, 868  | 900, 000 | \$27, 000 | 18, 279, 768 | \$406, 788  |
| Fish, salted .....               | 6, 175, 002 | 146, 574  | 5, 976, 573  | 208, 117    | 720, 000 | 28, 800   | 16, 849, 926 | 478, 225    |
| Fish, pickled .....              | 2, 786      | 279       | 652, 000     | 14, 600     |          |           | 691, 786     | 15, 740     |
| Smoked herring, boneless .....   |             |           |              |             |          |           | 63, 750      | 5, 626      |
| Sounds, green .....              | 67, 969     | 3, 543    |              |             |          |           | 77, 969      | 3, 983      |
| Sounds, dried .....              |             |           | 10, 725      | 2, 464      |          |           | 23, 873      | 5, 288      |
| Tongues, dried .....             | 2, 000      | 40        | 2, 360       | 96          |          |           | 11, 445      | 412         |
| Livers .....                     | 255, 200    | 2, 321    |              |             |          |           | 255, 200     | 2, 321      |
| Oil .....                        | 13, 192     | 3, 926    | 12, 960      | 3, 240      | 3, 756   | 1, 132    | 52, 950      | 14, 842     |
| Fish skins .....                 | 44          | 1, 848    | 6            | 210         |          |           | 50           | 2, 058      |
| Scrap .....                      | 181         | 1, 629    | 37           | 334         |          |           | 218          | 1, 963      |
| Lobsters, live .....             | 847, 859    | 97, 135   | 5, 356, 477  | 696, 344    |          |           | 6, 204, 326  | 793, 479    |
| Lobsters, boiled .....           | 197, 815    | 26, 705   | 515, 518     | 82, 483     |          |           | 713, 333     | 109, 188    |
| Scallops .....                   | 551         | 419       |              |             |          |           | 551          | 419         |
| Clams, fresh .....               | 20, 385     | 11, 286   | 19, 128      | 14, 580     |          |           | 39, 513      | 25, 866     |
| Clam meat, fresh, barrels .....  | 80          | 550       | 200          | 1, 000      |          |           | 655          | 3, 613      |
| Clam meat, salted, barrels ..... | 65          | 390       | 1, 880       | 10, 730     |          |           | 5, 575       | 29, 380     |
| Total .....                      |             | 329, 566  |              | 1, 376, 066 |          | 56, 932   |              | 1, 899, 191 |

## SMOKED HERRING.

The smoked herring prepared by the fishermen are shown as such in the general-products table for the State. The American-caught herring smoked by the canners and regular smokers are included in the statistics relating to the canning and smoked-fish industries, but are shown as fresh herring in the general-products table, that being the condition in which they were sold by the fishermen. It is customary for many of the fishermen to smoke a part of their own catch, but other classes of smokers utilize both American and Canadian caught herring for smoking purposes.

Table showing the quantity and value of smoked herring prepared in Maine in 1898.

| Designation.                    | Lbs.         | Value.    |
|---------------------------------|--------------|-----------|
| Smoked by fishermen .....       | 3, 738, 500  | \$63, 005 |
| Smoked by canners .....         | 2, 413, 420  | 42, 341   |
| Smoked by regular smokers ..... | 4, 519, 250  | 80, 490   |
| Total .....                     | 10, 671, 170 | 185, 836  |

*Table showing the quantity and value of smoked herring prepared in Maine in various years from 1880 to 1898.*

| Years.     | Lbs.         | Value.    |
|------------|--------------|-----------|
| 1880 ..... | 4, 434, 111  | \$99, 973 |
| 1887 ..... | 3, 419, 485  | 100, 488  |
| 1888 ..... | 4, 360, 435  | 140, 154  |
| 1889 ..... | 5, 090, 425  | 159, 330  |
| 1892 ..... | 10, 151, 695 | 232, 036  |
| 1898 ..... | 10, 671, 170 | 185, 836  |

## THE MENHADEN INDUSTRY.

There has been considerable increase in the menhaden industry since 1889. In that year there were three factories, valued at \$22,200, while in 1898 there were four factories, valued at \$190,000. The products have increased from 282,465 gallons of oil, valued at \$62,405, and 2,305 tons of scrap, valued at \$24,735 in 1889, to 765,000 gallons of oil, valued at \$191,250, and 9,120 tons of scrap, valued at \$91,200 in 1898. In 1899, however, the factories were not operated, as no menhaden appeared along the coast of Maine during that year.

With the exception of the preparation of menhaden for bait by fishermen and dealers, the following table shows the extent of the menhaden industry of Maine in 1898:

*Table showing the extent of the menhaden industry of Maine in 1898.*

| Items.                             | No.            | Value.     |
|------------------------------------|----------------|------------|
| Factories in operation .....       | 4              | \$190, 000 |
| Cash capital .....                 |                | 100, 000   |
| Wages paid factory employees ..... |                | 73, 000    |
| Employees in factories .....       | 446            |            |
| Fishermen on vessels .....         | 41             |            |
| Steam vessels employed .....       | 3              | 21, 000    |
| Net tonnage of vessels .....       | 76             |            |
| Outfits of vessels .....           |                | 6, 010     |
| Menhaden utilized .....            | * 52, 392, 400 |            |
| Oil made .....                     | 765, 000       | 191, 250   |
| Scrap prepared .....               | 9, 120         | 91, 200    |

\*A considerable quantity of the menhaden utilized were caught by vessels owned in other States.

## FISHERIES OF NEW HAMPSHIRE.

The commercial fisheries of New Hampshire are confined to Rockingham County, that being the only one in the State touching the Atlantic seaboard.

In 1898 the number of persons employed was 154. There were 5 vessels employed, valued with their outfits at \$7,358, and 123 boats valued at \$5,395. The value of the fishing apparatus was \$12,120. The value of the pound nets and weirs represented more than half of this amount, being \$6,960. The shore property and cash capital aggregated \$27,775, the total investment being \$52,648. The fisheries of this State have decreased in the amount of capital invested and in the value of the products about 50 per cent since 1889.

The products in 1898 were worth \$48,987. The greater part of this value was derived from the yield of cod, hake, haddock, cusk, and pollock, which were worth \$29,473. The yield of the lobster fishery was valued at \$9,372 and that of the mackerel fishery at \$3,207. The remaining products had a value of \$6,935.

The three tables which follow show the extent of the fisheries in detail for the year 1898.

*Persons employed.*

| How engaged.                     | No. |
|----------------------------------|-----|
| On vessels fishing .....         | 28  |
| In shore or boat fisheries ..... | 115 |
| Shoresmen .....                  | 11  |
| Total .....                      | 154 |

*Table of products.*

| Species.               | Vessel fisheries. |         | Shore fisheries. |        | Total.    |        |
|------------------------|-------------------|---------|------------------|--------|-----------|--------|
|                        | Lbs.              | Value.  | Lbs.             | Value. | Lbs.      | Value. |
| Alewives, fresh .....  |                   |         | 25,000           | \$250  | 25,000    | \$250  |
| Alewives, salted ..... |                   |         | 200,000          | 2,500  | 200,000   | 2,500  |
| Cod, fresh .....       | 129,300           | \$1,958 | 559,850          | 8,798  | 689,150   | 10,756 |
| Cod, salted .....      |                   |         | 2,000            | 70     | 2,000     | 70     |
| Cusk .....             | 62,000            | 620     | 35,500           | 375    | 97,500    | 995    |
| Haddock, fresh .....   | 303,000           | 3,045   | 1,076,750        | 11,507 | 1,379,750 | 14,552 |
| Haddock, salted .....  |                   |         | 4,000            | 100    | 4,000     | 100    |
| Hake, fresh .....      | 2,500             | 13      | 112,900          | 1,366  | 115,400   | 1,379  |
| Hake, salted .....     |                   |         | 1,500            | 38     | 1,500     | 38     |
| Herring .....          |                   |         | 65,000           | 650    | 65,000    | 650    |
| Mackerel .....         | 42,000            | 2,220   | 16,750           | 987    | 58,750    | 3,207  |
| Perch, white .....     |                   |         | 1,650            | 165    | 1,650     | 165    |
| Pollock, fresh .....   | 88,700            | 444     | 91,500           | 1,115  | 180,200   | 1,559  |
| Pollock, salted .....  |                   |         | 1,200            | 24     | 1,200     | 24     |
| Striped bass .....     |                   |         | 850              | 85     | 850       | 85     |
| Lobsters .....         |                   |         | 108,515          | 9,372  | 108,515   | 9,372  |
| Clams, soft .....      |                   |         | 6,000            | 360    | * 6,000   | 360    |
| Irish moss .....       |                   |         | 70,000           | 2,450  | 70,000    | 2,450  |
| Oil .....              | 8,250             | 275     | 6,000            | 200    | † 14,250  | 475    |
| Total .....            | 635,750           | 8,575   | 2,384,965        | 40,412 | 3,020,715 | 48,987 |

\* 600 bushels.

† 1,900 gallons.

*Table of apparatus and capital.*

| Items.                      | No. | Value.  | Items.                      | No.   | Value. |
|-----------------------------|-----|---------|-----------------------------|-------|--------|
| Vessels fishing .....       | 5   | \$3,900 | Apparatus—shore fisheries:  |       |        |
| Tonnage .....               | 79  |         | Pound nets and weirs .....  | 17    | 6,960  |
| Outfit .....                |     | 3,458   | Gill nets .....             | 20    | 244    |
| Boats .....                 | 123 | 5,395   | Lines, hand and trawl ..... |       | 1,393  |
| Apparatus—vessel fisheries: |     |         | Pots, lobster .....         | 1,675 | 1,666  |
| Seines .....                | 1   | 500     | Rakes .....                 | 10    | 32     |
| Gill nets .....             | 40  | 600     | Shore property .....        |       | 12,775 |
| Lines, trawl .....          |     | 725     | Cash capital .....          |       | 15,000 |
|                             |     |         | Total .....                 |       | 52,648 |

## PRODUCTS WITH EACH APPARATUS.

The yield of the vessel fisheries by seines, gill nets, and hand and trawl lines was valued at \$8,575. In the shore fisheries the yield of the gill nets was valued at \$537; that of pound nets and weirs, \$4,550; of trawl and hand lines, \$23,143; and of all other apparatus, \$12,182; the total value being \$40,412.

*Table showing the yield of the vessel fisheries of New Hampshire in 1898.*

| Apparatus.         | Species.       | Lbs.    | Value.  |
|--------------------|----------------|---------|---------|
| Seines .....       | Mackerel ..... | 30,000  | \$1,500 |
| Gill nets .....    | do .....       | 12,000  | 720     |
| Lines, trawl ..... | Cod .....      | 129,300 | 1,958   |
| Do .....           | Cusk .....     | 62,000  | 620     |
| Do .....           | Haddock .....  | 303,000 | 3,045   |
| Do .....           | Hake .....     | 2,500   | 13      |
| Do .....           | Pollock .....  | 88,700  | 444     |
| Do .....           | Oil .....      | 8,250   | 275     |
| Total .....        |                | 593,750 | 6,355   |
| Grand total .....  |                | 635,750 | 8,575   |

*Table showing the yield of the shore fisheries of New Hampshire in 1898.*

| Apparatus and species. | Lbs.    | Value. | Apparatus and species. | Lbs.      | Value.  |
|------------------------|---------|--------|------------------------|-----------|---------|
| Gill nets:             |         |        | Lines, trawl and hand: |           |         |
| Herring .....          | 5,000   | \$50   | Cod, fresh .....       | 529,850   | \$8,348 |
| Mackerel .....         | 6,750   | 487    | Cod, salted .....      | 2,000     | 70      |
| Total .....            | 11,750  | 537    | Cusk .....             | 35,500    | 375     |
| Pound nets and weirs:  |         |        | Haddock, fresh .....   | 1,076,750 | 11,507  |
| Alewives, fresh .....  | 25,000  | 250    | Haddock, salted .....  | 4,000     | 100     |
| Alewives, salted ..... | 200,000 | 2,500  | Hake, fresh .....      | 112,900   | 1,366   |
| Cod .....              | 30,000  | 450    | Hake, salted .....     | 1,500     | 38      |
| Herring .....          | 60,000  | 600    | Pollock, fresh .....   | 91,500    | 1,115   |
| Mackerel .....         | 10,000  | 500    | Pollock, salted .....  | 1,200     | 24      |
| Perch, white .....     | 1,650   | 165    | Oil .....              | 6,000     | 200     |
| Striped bass .....     | 850     | 85     | Total .....            | 1,861,200 | 23,143  |
| Total .....            | 327,500 | 4,550  | Rakes:                 |           |         |
| Pots:                  |         |        | Clams, soft .....      | 6,000     | 360     |
| Lobsters .....         | 108,515 | 9,372  | Irish moss .....       | 70,000    | 2,450   |
|                        |         |        | Total .....            | 76,000    | 2,810   |
|                        |         |        | Grand total .....      | 2,384,965 | 40,412  |

## FISHERIES OF MASSACHUSETTS.

Massachusetts has over two-thirds of the investment, more than half of the quantity, and nearly half of the value of the products of the coast fisheries of New England. It is the leading fishing State of New England, and in the items of investment and value of products it surpasses any other State. It had until recent years more persons employed in the fishing industry than any other New England State, but is now exceeded by Maine in this respect. The most important branches of fishing prosecuted by vessels are the offshore bank fisheries for cod, haddock, hake, halibut, and other ground species; the mackerel fishery, and the whale fishery. The shore, or boat, fisheries embrace a large number of species, but yield only about 20 per cent of the total value of the fishery products of the State, a smaller percentage than any other New England State except Connecticut.

The principal fishing ports, where the largest fleets of vessels are owned and operated, are Gloucester, Boston, Provincetown, and New Bedford. A considerable number of vessels, mostly of small size, are owned in various other localities, while the shore or boat fisheries are prosecuted to a greater or less extent along the entire coast. The whale fishery was engaged in by vessels from Boston and Provincetown, but is centered principally at New Bedford. Some of the whaling vessels owned at New Bedford have headquarters at San Francisco, Cal., but are included in the statistics for Massachusetts.

The products of the fisheries of this State are derived chiefly from the numerous offshore fishing banks extending along the North American coast from Nantucket Shoals, Massachusetts, to the Grand Banks of Newfoundland. The products taken by boats in the shore fisheries and by the smallest class of vessels represent practically all that are obtained from jurisdictional waters. A very large percentage of the principal species taken by vessels in the cod fisheries is from offshore grounds. The mackerel fishery is also prosecuted along the coast, to a greater or less extent, from Florida to the Gulf of St. Lawrence.

The halibut supply has for many years been obtained mainly from the banks off the New England coast, and from La Have, Banquereau, Western, Grand, and other eastern banks. Since about 1895 large quantities of halibut have been secured on grounds located to the north-east of Newfoundland, in latitude  $48^{\circ}$  to  $50^{\circ}$  N. and longitude  $50^{\circ}$  to  $51^{\circ}$  W. The great demand for halibut in 1898 induced a Boston firm to send a steam vessel on a voyage to the halibut grounds in the North Pacific Ocean. These grounds are principally in latitude  $50^{\circ}$  to  $55^{\circ}$  N. and longitude  $135^{\circ}$  to  $140^{\circ}$  W. This vessel had a crew of 28 men, and during October, November, and December secured 411,011 pounds of fresh halibut which, after being landed, was packed in refrigerator cars and shipped to Boston by railroad, where it arrived in good condition. It is interesting to note that the fishing-grounds in the North Atlantic



and Pacific oceans on which halibut have been found to be abundant in the past few years are in approximately the same latitude.

In the whale fishery one bark from Boston took 400 barrels of sperm oil in the Okotsk Sea, north of Japan; one brig made a similar catch in West Indian waters; one bark, the *Swallow*, visited Kerguelen, or Desolation Island, to obtain sea-elephant oil, and one schooner was at the close of the year in those waters on a sealing voyage. There were also four vessels from Provincetown fishing in the South Atlantic Ocean, and the whaling fleet from New Bedford fished in the North and South Atlantic, North and South Pacific, and Arctic oceans.

The bark *Swallow*, of 310 tons, above referred to, with a crew of 34 men, sailed from Boston in July and arrived at Kerguelen Island in December, 1897. This island is in the Southern Ocean in latitude 49° S. and longitude 69° E. Within three months about 4,000 sea-elephants were secured, which yielded 63,000 gallons of oil having a value of \$20,790. It being summer in that locality, no difficulty was experienced from ice, but heavy fogs prevailed the greater part of the time. The younger sea-elephants were taken in December, the larger ones later in the season. They were all killed on shore by the use of rifles, lances, and harpoons. Only the oil from the animals was saved. It is used chiefly in tanning morocco and other leather. The vessel left the island in March and returned to Massachusetts on July 20, 1898, after an absence of about a year. The captain reports that at Kerguelen Island the young sea-elephants are chiefly produced in November, as very few were born after his arrival there, and that they shed their hair in December. The voyage of the *Swallow* is noteworthy, as the Kerguelen Island sea-elephant fishery has not been regularly prosecuted for a long period, the only other vessel visiting the island in recent years being the *Francis Allen*, of New London, Conn., in about 1894.

The herring fisheries furnish another instance in which the products are derived largely from waters outside of State jurisdiction, the Newfoundland herring fishery alone yielding about half of the entire catch of this species. This fishery is apparently increasing in importance. In 1896 it was engaged in by 43 vessels from Gloucester, 3 from Beverly, and 1 from Provincetown; a total of 47 vessels, with a net tonnage of 4,981 tons and a value of \$239,316; the value of their outfit, seines and gill nets, was \$29,123 and the number of fishermen was 440. The quantity of fresh frozen herring secured was 8,441,842 pounds, valued at \$117,649, and of salted herring 1,807,575 pounds, valued at \$18,150. In 1898 the Newfoundland herring fleet had increased to 56 vessels, valued at \$281,028. Of these, 51 were from Gloucester, 2 from Beverly, and 3 from Boston; their net tonnage was 4,542 tons, the value of their outfit, seines and gill nets, \$48,650, and the number of fishermen 450. The quantity of fresh frozen herring obtained was 9,398,872 pounds, valued at \$197,490, and of salted herring 5,545,199 pounds, valued at \$72,862; a total of 14,944,071 pounds, valued at \$270,352.

## GENERAL STATISTICS.

In 1898 14,363 persons were employed in the coast fisheries of Massachusetts—on vessels fishing, 6,962; on vessels transporting fishery products, 14; in the shore or boat fisheries, 3,365; and as shoresmen in the various branches of fishery industry, 4,022.

The vessels engaged in fishing and transporting numbered 637, worth \$1,776,025. Their net tonnage was 30,558 tons, and the value of their outfits \$939,772. The number of boats used in the shore fisheries was 2,625, valued at \$178,082. The apparatus of capture, consisting of seines, gill nets, pound nets, trap nets, fyke nets, drag nets, dip nets, hand and trawl lines, lobster and eel pots, harpoons, dredges, tongs, rakes, and various minor apparatus, was valued at \$556,525. Of this amount \$337,082 belong to the vessel and \$219,443 to shore fisheries. This is exclusive of harpoons, guns, and other means of capture used in the whale fisheries, the value of which is included in the outfits of vessels. The shore and accessory property employed in the fisheries and fishery industries was valued at \$5,125,248, and the cash capital amounted to \$4,797,250, the total investment being \$13,372,902.

The products of the fisheries aggregated 202,257,817 pounds, valued at \$4,463,727. About 70 per cent of this quantity and nearly 50 per cent of the value were comprised of the five principal species obtained in the cod fisheries. These, combining the fresh and the salted of each species, were cod, 71,314,978 pounds, \$1,407,039; cusk, 5,954,036 pounds, \$63,514; haddock, 35,581,514 pounds, \$419,818; hake, 21,331,816 pounds, \$163,634; and pollock, 7,084,037 pounds, \$43,045; the five species totalizing 141,266,381 pounds, and having a value of \$2,097,050. Other important species, with the quantity and value of fresh and salted, were halibut, 10,523,297 pounds, \$547,440; mackerel, 6,703,364 pounds, \$361,864; herring, 22,363,497 pounds, \$332,547; sword-fish, 597,186 pounds, \$35,280, and alewives, fresh, salted, and smoked, 2,535,201 pounds, \$31,288. The principal species disposed of wholly in a fresh condition were blue-fish, 832,849 pounds, \$38,089; eels, 425,846 pounds, \$17,635; flounders, 1,168,876 pounds, \$14,793; menhaden, 1,497,367 pounds, \$10,544; scup, 1,043,625 pounds, \$14,253, and squeteague, 1,371,910 pounds, \$39,518. Lobsters yielded 1,693,741 pounds, worth \$147,702. The more important mollusks were oysters, 101,225 bushels, \$156,235; clams, hard and soft, 210,912 bushels, \$153,318, and scallops, 145,919 bushels, \$94,971. The yield of the whale fisheries, consisting of whale, sperm, and sea-elephant oil, and whalebone, was valued at \$285,688.

A comparison of the statistics for 1898 with those for 1889 shows that there has been a decrease of 2,875 in the number of persons employed. The decrease in the number of vessel fishermen is 3,875, and in shore or boat fishermen, 383. This has been partly offset by an increase of 1,383 in the number of shoresmen.

The vessels have decreased 199, or nearly 24 per cent, in number,

and \$1,332,320, or 43 per cent, in value. The net tonnage has also decreased about 48 per cent. An instance of the gradual decrease in vessels during the past nine years is furnished by the fishing fleet at Gloucester, Mass. From July 1, 1897, to November 15, 1898, 27 vessels were sold and 24 lost; in the same period 11 vessels were purchased and 7 built; the net decrease in the fleet in the 17½ months being 33 vessels. The vessels sold and lost have generally been larger in size than those taking their places and the percentage of decrease in number has therefore not been so large as in value and tonnage. The decrease in boats is nearly 25 per cent in number and 30 per cent in value, and in the value of the apparatus of capture about 44 per cent. In the meantime there has been an increase of \$2,067,041 in the value of shore and accessory property, and of \$513,050 in the cash capital; resulting in an increase in the total investment of \$127,673.

The products in 1898 as compared with 1889, if the various species of algae gathered by fishermen are included, have decreased 96,959,852 pounds in quantity and \$1,394,547 in value. In 1889 the algae consisted of seaweed and Irish moss, and amounted to 117,993,900 pounds, valued at \$66,034, and in 1898 of 700,000 pounds of Irish moss, worth \$22,375. Eliminating these items for both years, the fishery products proper in 1898 show an increase of 20,334,048 pounds in quantity and a decrease of \$1,350,888 in value.

The following tables show the persons employed, the number and value of vessels, boats, and apparatus of capture, the value of shore and accessory property, the amount of cash capital, and the quantity and value of the products of the fisheries of Massachusetts in 1898.

*Persons employed.*

| How engaged.                     | No.    |
|----------------------------------|--------|
| On vessels fishing .....         | 6,962  |
| On vessels transporting .....    | 14     |
| In shore or boat fisheries ..... | 3,365  |
| Shoresmen .....                  | 4,022  |
| Total .....                      | 14,363 |

*Table of apparatus and capital.*

| Items.                      | No.    | Value.      | Items.                          | No.    | Value.     |
|-----------------------------|--------|-------------|---------------------------------|--------|------------|
| Vessels fishing .....       | 629    | \$1,772,725 | Apparatus—shore fisheries:      |        |            |
| Tonnage .....               | 30,494 |             | Seines .....                    | 52     | \$3,386    |
| Outfit .....                |        | 939,369     | Gill nets .....                 | 1,671  | 18,291     |
| Vessels transporting .....  | 8      | 3,300       | Pound nets and trap nets ..     | 126    | 141,835    |
| Tonnage .....               | 64     |             | Dip nets .....                  | 213    | 272        |
| Outfit .....                |        | 403         | Fyke nets .....                 | 88     | 1,124      |
| Boats .....                 | 2,625  | 178,082     | Drag nets .....                 | 21     | 1,260      |
| Apparatus—vessel fisheries: |        |             | Lines, hand and trawl .....     |        | 7,403      |
| Seines .....                | 220    | 84,996      | Pots, lobster .....             | 24,462 | 29,387     |
| Gill nets .....             | 2,961  | 32,021      | Pots, eel .....                 | 1,250  | 2,336      |
| Trap nets .....             | 4      | 900         | Dredges .....                   | 2,263  | 7,638      |
| Drag nets .....             | 6      | 350         | Tongs, rakes, and forks ..      |        | 6,147      |
| Lines, hand and trawl ..... |        | 213,962     | Minor apparatus .....           |        | 364        |
| Pots, lobster .....         | 1,792  | 2,094       | Shore and accessory property .. |        | 5,125,248  |
| Pots, eel .....             | 40     | 40          | Cash capital .....              |        | 4,797,250  |
| Harpoons <sup>a</sup> ..... | 338    | 1,200       |                                 |        |            |
| Dredges .....               | 350    | 1,414       | Total .....                     |        | 13,372,902 |
| Minor apparatus .....       |        | 105         |                                 |        |            |

<sup>a</sup> The harpoons, guns, etc., used on whaling vessels are included with the "outfits" of vessels fishing.

Table of products.

| Species.                    | Vessel fisheries. |           | Shore fisheries. |         | Total.      |           |
|-----------------------------|-------------------|-----------|------------------|---------|-------------|-----------|
|                             | Lbs.              | Value.    | Lbs.             | Value.  | Lbs.        | Value.    |
| Albacore.....               |                   |           | 36,090           | \$912   | 36,090      | \$912     |
| Alewives, fresh.....        | 2,000             | \$20      | 1,875,061        | 22,248  | 1,877,061   | 22,268    |
| Alewives, salted.....       |                   |           | 586,700          | 6,790   | 586,700     | 6,790     |
| Alewives, smoked.....       |                   |           | 71,440           | 2,230   | 71,440      | 2,230     |
| Blue-fish.....              | 455,615           | 22,227    | 377,234          | 15,862  | 832,849     | 38,089    |
| Bonito.....                 | 18,000            | 520       | 71,136           | 1,890   | 89,136      | 2,410     |
| Butter-fish.....            | 100               | 5         | 30,520           | 813     | 30,620      | 818       |
| Cat-fish.....               | 5,200             | 110       |                  |         | 5,200       | 110       |
| Cod, fresh.....             | 38,046,353        | 637,747   | 2,585,798        | 50,974  | 40,632,151  | 688,721   |
| Cod, salted.....            | 29,573,631        | 684,186   | 1,109,196        | 34,132  | 30,682,827  | 718,318   |
| Cunners.....                | 100               | 5         | 85,250           | 5,245   | 85,350      | 5,250     |
| Cusk, fresh.....            | 5,766,173         | 60,708    | 59,000           | 600     | 5,825,173   | 61,308    |
| Cusk, salted.....           | 128,863           | 2,206     |                  |         | 128,863     | 2,206     |
| Eels.....                   | 76,667            | 1,900     | 349,179          | 15,735  | 425,846     | 17,635    |
| Flounders.....              | 289,225           | 4,490     | 879,651          | 10,303  | 1,168,876   | 14,793    |
| Haddock, fresh.....         | 34,450,284        | 403,999   | 1,001,000        | 14,527  | 35,451,284  | 418,526   |
| Haddock, salted.....        | 128,886           | 1,268     | 1,344            | 24      | 130,230     | 1,292     |
| Hake, fresh.....            | 20,738,753        | 158,668   | 360,675          | 2,827   | 21,099,428  | 161,495   |
| Hake, salted.....           | 232,388           | 2,139     |                  |         | 232,388     | 2,139     |
| Halibut, fresh.....         | 8,663,443         | 487,714   |                  |         | 8,663,443   | 487,714   |
| Halibut, salted.....        | 1,859,854         | 59,726    |                  |         | 1,859,854   | 59,726    |
| Herring, fresh.....         | 10,348,422        | 206,956   | 6,213,916        | 49,379  | 16,562,338  | 256,335   |
| Herring, salted.....        | 5,801,159         | 76,212    |                  |         | 5,801,159   | 76,212    |
| Hickory shad.....           |                   |           | 1,000            | 15      | 1,000       | 15        |
| King-fish.....              |                   |           | 245              | 22      | 245         | 22        |
| Mackerel, fresh.....        | 2,501,360         | 144,672   | 1,289,873        | 52,667  | 3,791,233   | 197,339   |
| Mackerel, salted.....       | 2,905,681         | 164,150   | 6,450            | 375     | 2,912,131   | 164,525   |
| Menhaden.....               | 919,887           | 5,992     | 577,480          | 4,552   | 1,497,367   | 10,544    |
| Perch.....                  |                   |           | 57,523           | 3,662   | 57,523      | 3,662     |
| Pollock, fresh.....         | 5,160,198         | 29,137    | 1,406,190        | 9,119   | 6,566,388   | 38,256    |
| Pollock, salted.....        | 486,617           | 4,231     | 31,032           | 558     | 517,649     | 4,789     |
| Pompano.....                |                   |           | 150              | 15      | 150         | 15        |
| Salmon.....                 |                   |           | 60               | 30      | 60          | 30        |
| Scup.....                   | 21,700            | 364       | 1,021,925        | 13,889  | 1,043,625   | 14,253    |
| Sea bass.....               | 24,700            | 746       | 74,600           | 4,200   | 99,300      | 4,946     |
| Shad.....                   |                   |           | 29,333           | 1,426   | 29,333      | 1,426     |
| Smelt.....                  |                   |           | 7,079            | 515     | 7,079       | 515       |
| Spanish mackerel.....       |                   |           | 210              | 30      | 210         | 30        |
| Squeteague.....             | 56,800            | 642       | 1,315,110        | 38,876  | 1,371,910   | 39,518    |
| Striped bass.....           | 3,649             | 349       | 9,299            | 590     | 12,948      | 939       |
| Sturgeon.....               |                   |           | 8,490            | 402     | 8,490       | 402       |
| Sword-fish, fresh.....      | 569,916           | 34,465    |                  |         | 569,916     | 34,465    |
| Sword-fish, salted.....     | 27,270            | 815       |                  |         | 27,270      | 815       |
| Tautog.....                 | 29,430            | 879       | 260,075          | 6,688   | 289,505     | 7,567     |
| Whiting or silver hake..... |                   |           | 37,200           | 492     | 37,200      | 492       |
| Squid, fresh.....           | 300,275           | 9,008     | 764,150          | 5,562   | 1,064,425   | 14,570    |
| Squid, salted.....          | 5,000             | 50        |                  |         | 5,000       | 50        |
| Lobsters.....               | 70,941            | 6,552     | 1,622,800        | 141,150 | 1,693,741   | 147,702   |
| Shrimp.....                 |                   |           | 25,200           | 1,183   | 25,200      | 1,183     |
| Clams, hard.....            |                   |           | 510,536          | 50,724  | a 510,536   | 50,724    |
| Clams, soft.....            |                   |           | 1,470,951        | 102,594 | b 1,470,951 | 102,594   |
| Mussels.....                |                   |           | 7,400            | 130     | c 7,400     | 130       |
| Oysters.....                | 210               | 50        | 708,365          | 156,185 | d 708,575   | 156,235   |
| Scallops.....               | 110,984           | 12,866    | 764,528          | 82,105  | e 875,512   | 94,971    |
| Irish moss.....             |                   |           | 700,000          | 22,375  | 700,000     | 22,375    |
| Winkles.....                | 9,500             | 475       |                  |         | f 9,500     | 475       |
| Cod sounds and tongues..... | 34,855            | 889       |                  |         | 34,855      | 889       |
| Hake sounds.....            | 32,707            | 1,914     |                  |         | 32,707      | 1,914     |
| Haddock spawn.....          | 700               | 18        |                  |         | 700         | 18        |
| Halibut fins.....           | 21,900            | 384       |                  |         | 21,900      | 384       |
| Oil, fish.....              | 354,427           | 13,843    | 4,500            | 120     | g 358,927   | 13,963    |
| Oil, sea-elephant.....      | 472,500           | 20,790    |                  |         | h 472,500   | 20,790    |
| Oil, whale.....             | 3,119,450         | 199,023   |                  |         | i 3,119,450 | 199,023   |
| Whalebone.....              | 27,100            | 65,875    |                  |         | 27,100      | 65,875    |
| Total.....                  | 173,852,873       | 3,528,985 | 28,404,944       | 934,742 | 202,257,817 | 4,463,727 |

a 63,817 bushels.  
b 147,095 bushels.  
c 700 bushels.

d 101,225 bushels.  
e 145,919 bushels.  
f 950 bushels.

g 47,857 gallons.  
h 63,000 gallons.  
i 415,927 gallons.

## THE FISHERIES BY COUNTIES.

There are eight counties on the coast of this State, all of which are interested in the fishing industry. These are Essex, Suffolk, Norfolk, Plymouth, Barnstable, Nantucket, Dukes, and Bristol. The fisheries of Essex County are the most extensive. The number of persons employed in this county was 7,025. There were 4,853 in the vessel fisheries, 740 in the shore or boat fisheries, and 1,432 in the wholesale trade in fishery products and other shore industries connected with the fisheries. The number of vessels fishing was 352, valued at \$1,220,420, and their outfits at \$655,893; the number of boats was 451, valued at \$18,051; the fishing apparatus was valued at \$262,403, the shore and accessory property at \$1,758,311, and the cash capital at \$2,346,000, the total investment being \$6,261,078. The products amounted to 134,744,667 pounds, having a value of \$2,578,806. The extent of the fisheries of this county will be better appreciated when it is stated that they represent practically one-half the fishery interests of the State and are nearly equal in value to the fisheries of Maine, while they exceed those of either of the other New England States.

The county next in importance is Suffolk. Its fisheries center at Boston and gave employment to 3,027 persons, of whom 963 were vessel fishermen, 129 shore or boat fishermen, and 1,935 shoresmen. The number of vessels fishing was 60, valued at \$313,300, their outfits having a value of \$188,275. There were 99 boats used in the shore fisheries, worth \$5,590. The fishing apparatus was valued at \$62,372, the shore and accessory property at \$3,160,910, and the cash capital at \$2,251,750, a total investment of \$5,982,197. The quantity of products obtained was 27,780,143 pounds, valued at \$529,835.

In addition to considerable quantities of other species, the fisheries of these two counties produced 87 per cent of the quantity and 85 per cent of the value of the fresh and salted cod, cusk, haddock, hake, and pollock; 94 per cent of the quantity and 91 per cent of the value of the halibut; 60 per cent of the quantity and 72 per cent of the value of the mackerel, and 85 per cent of the quantity and 91 per cent of the value of the herring taken in the fisheries of the entire State. The products in both of these counties are derived mainly from the vessel fisheries. The investment is also exceptionally large, especially in the items of shore property and cash capital, which is due chiefly to the extensive wholesale trade in fishery products at Gloucester and Boston.

Barnstable County had 2,307 persons engaged in the fisheries. Of these 905 were on vessels fishing and transporting, 1,126 in the shore fisheries, and 276 were shoresmen. The number of vessels employed was 157, valued at \$186,755; and of boats in the shore fisheries, 929, valued at \$61,242. The fishing apparatus was valued at \$177,318. Of this amount \$132,683 is the value of the apparatus in the shore fisheries,



which are more extensive than in any other county in the State. The more important forms of apparatus used were seines, gill nets, and lines in the vessel fisheries, and pound nets in the shore fisheries. The total investment, including outfits of vessels, shore property, and cash capital, was \$608,158; and the products amounted to 26,761,104 pounds, valued at \$741,826.

Provincetown is the principal fishing port in this county. It had 62 vessels engaged in the food fisheries and 4 in the whale fishery, a total of 66 vessels, valued at \$134,950. The greater part of the fleet in the food fisheries fished on Georges and other banks off the New England coast, and six of the largest vessels made trips to the Grand Banks of Newfoundland. The catch was marketed chiefly at Boston. There were also 205 boats of various classes used in the shore fisheries. The persons employed numbered 912, of whom 650 were vessel fishermen, 149 shore fishermen, and 113 shoresmen. The total investment was \$376,020, and the value of the products obtained by vessels and boats was \$355,907.

Besides the usual branches of fishing by vessels and boats, a fishery for flounders is carried on in the harbor during the winter by boats and by the smaller class of vessels with drag nets. These nets are similar in construction to a beam trawl. They are 30 feet wide at the mouth, 5 feet wide at the extreme end, and the length is 35 feet. The method of operating them is to throw them overboard and drag them on the bottom like a dredge, drawing them up at intervals to empty the catch on the deck of the boat or vessel. They have been used in this locality only a few years, and seldom take any other species than flounders.

In each of the five remaining counties the fisheries are less extensive. The aggregate number of persons employed was 2,004; the investment, \$521,469; and the quantity of the products, 12,971,903 pounds, valued at \$613,260.

The following statistical statements of the value of the fishing apparatus, and the quantity and value of the products of the vessel and the shore fisheries will serve to illustrate the importance of each of these branches of fishing in the various counties:

*Value of fishing apparatus in the vessel and shore fisheries.*

| Counties.        | Vessel fisheries. | Shore fisheries. |
|------------------|-------------------|------------------|
| Essex .....      | \$232, 963        | \$29, 440        |
| Suffolk .....    | 50, 845           | 11, 527          |
| Norfolk .....    |                   | 2, 480           |
| Plymouth .....   | 3, 739            | 12, 863          |
| Barnstable ..... | 44, 635           | 132, 683         |
| Nantucket .....  | 3, 240            | 3, 990           |
| Dukes .....      | 706               | 17, 963          |
| Bristol .....    | 954               | 8, 497           |



*Quantity and value of products of the vessel and shore fisheries.*

| Counties.       | Vessel fisheries. |               | Shore fisheries. |            |
|-----------------|-------------------|---------------|------------------|------------|
|                 | Lbs.              | Value.        | Lbs.             | Value.     |
| Essex.....      | 127, 013, 794     | \$2, 383, 054 | 7, 730, 873      | \$195, 752 |
| Suffolk.....    | 26, 096, 218      | 470, 285      | 1, 683, 925      | 59, 550    |
| Norfolk.....    |                   |               | 298, 000         | 10, 800    |
| Plymouth.....   | 1, 064, 050       | 21, 044       | 1, 809, 950      | 103, 670   |
| Barnstable..... | 15, 708, 541      | 384, 980      | 11, 052, 563     | 356, 846   |
| Nantucket.....  | 364, 587          | 15, 802       | 1, 213, 795      | 44, 267    |
| Dukes.....      | 186, 580          | 6, 663        | 3, 298, 505      | 102, 432   |
| Bristol.....    | 3, 419, 103       | 247, 157      | 1, 317, 333      | 61, 425    |

The three tables which follow show in detail the extent of the fisheries in each county of Massachusetts in 1898:

*Number of persons employed in the fisheries of Massachusetts in 1898.*

| Counties.       | On vessels fishing. | On vessels transporting. | In shore or boat fisheries. | Shoresmen. | Total.  |
|-----------------|---------------------|--------------------------|-----------------------------|------------|---------|
| Essex.....      | 4, 853              |                          | 740                         | 1, 432     | 7, 025  |
| Suffolk.....    | 963                 |                          | 129                         | 1, 935     | 3, 027  |
| Norfolk.....    |                     |                          | 37                          |            | 37      |
| Plymouth.....   | 62                  |                          | 495                         | 193        | 750     |
| Barnstable..... | 899                 | 6                        | 1, 126                      | 276        | 2, 307  |
| Nantucket.....  | 43                  |                          | 136                         | 50         | 229     |
| Dukes.....      | 25                  | 1                        | 295                         | 46         | 367     |
| Bristol.....    | 117                 | 7                        | 407                         | 90         | 621     |
| Total.....      | 6, 962              | 14                       | 3, 365                      | 4, 022     | 14, 363 |

*Table showing, by counties, the vessels, boats, apparatus, and capital employed in the fisheries of Massachusetts in 1898.*

| Items.                            | Essex.  |               | Suffolk. |             | Norfolk. |          | Plymouth. |           |
|-----------------------------------|---------|---------------|----------|-------------|----------|----------|-----------|-----------|
|                                   | No.     | Value.        | No.      | Value.      | No.      | Value.   | No.       | Value.    |
| Vessels fishing.....              | 352     | \$1, 220, 420 | 60       | \$313, 300  |          |          | 9         | \$18, 250 |
| Tonnage.....                      | 21, 812 |               | 4, 199   |             |          |          | 155       |           |
| Outfit.....                       |         | 655, 893      |          | 188, 275    |          |          |           | 6, 080    |
| Boats.....                        | 451     | 18, 051       | 99       | 5, 590      | 31       | \$1, 500 | 399       | 40, 122   |
| Apparatus—vessel fisheries:       |         |               |          |             |          |          |           |           |
| Seines.....                       | 168     | 65, 150       | 13       | 6, 100      |          |          | 2         | 800       |
| Gill nets.....                    | 1, 145  | 12, 433       | 40       | 400         |          |          | 70        | 700       |
| Trap nets.....                    | 4       | 900           |          |             |          |          |           |           |
| Lines, hand and trawl.....        |         | 153, 692      |          | 43, 950     |          |          |           | 2, 078    |
| Pots, lobster.....                | 300     | 300           |          |             |          |          |           |           |
| Harpoons.....                     | 147     | 423           | 79       | 395         |          |          | 11        | 76        |
| Dredges.....                      |         |               |          |             |          |          | 24        | 85        |
| Minor apparatus.....              |         | 65            |          |             |          |          |           |           |
| Apparatus—shore fisheries:        |         |               |          |             |          |          |           |           |
| Seines.....                       |         |               |          |             |          |          | 1         | 17        |
| Gill nets.....                    | 567     | 6, 480        | 25       | 250         | 50       | 900      | 38        | 380       |
| Pound nets and trap nets.....     | 16      | 12, 920       | 3        | 6, 000      |          |          |           |           |
| Dip nets.....                     | 83      | 95            |          |             |          |          | 29        | 36        |
| Lines, hand and trawl.....        |         | 3, 812        |          |             |          |          |           | 37        |
| Pots, lobster.....                | 5, 375  | 5, 495        | 4, 055   | 5, 187      | 1, 200   | 1, 500   | 6, 813    | 8, 662    |
| Pots, eel.....                    | 140     | 280           |          |             |          |          |           |           |
| Dredges.....                      |         |               |          |             |          |          | 667       | 2, 333    |
| Tongs, rakes, and forks.....      |         | 328           |          | 50          |          | 80       |           | 1, 398    |
| Minor apparatus.....              |         | 30            |          | 40          |          |          |           |           |
| Shore and accessory property..... |         |               |          |             |          | 600      |           | 13, 010   |
| Cash capital.....                 |         | 1, 758, 311   |          | 3, 160, 910 |          |          |           |           |
|                                   |         | 2, 346, 000   |          | 2, 251, 750 |          |          |           |           |
| Total.....                        |         | 6, 261, 078   |          | 5, 982, 197 |          | 4, 580   |           | 94, 064   |

Table showing, by counties, the vessels, boats, apparatus, and capital employed in the fisheries of Massachusetts in 1898—Continued.

| Items.                             | Barnstable. |           | Nantucket. |          | Dukes. |         | Bristol. |          |
|------------------------------------|-------------|-----------|------------|----------|--------|---------|----------|----------|
|                                    | No.         | Value.    | No.        | Value.   | No.    | Value.  | No.      | Value.   |
| Vessels fishing .....              | 154         | \$186,005 | 17         | \$14,000 | 12     | \$6,000 | 25       | \$14,750 |
| Tonnage .....                      | 3,746       |           | 130        |          | 75     |         | 377      |          |
| Outfit .....                       |             | 78,502    |            | 1,218    |        | 769     |          | 8,632    |
| Vessels transporting .....         | 3           | 750       |            |          | 1      | 1,500   | 4        | 1,050    |
| Tonnage .....                      | 15          |           |            |          | 6      |         | 43       |          |
| Outfit .....                       |             | 68        |            |          |        | 110     |          | 225      |
| Boats .....                        | 929         | 61,242    | 154        | 5,270    | 240    | 18,872  | 322      | 27,435   |
| Apparatus—vessel fisheries:        |             |           |            |          |        |         |          |          |
| Seines .....                       | 32          | 12,300    | 3          | 450      | 2      | 196     |          |          |
| Gill nets .....                    | 1,563       | 16,183    | 142        | 2,260    | 1      | 45      |          |          |
| Drag nets .....                    | 6           | 350       |            |          |        |         |          |          |
| Lines, hand and trawl .....        |             | 13,499    |            | 107      |        | 120     |          | 516      |
| Pots, lobster .....                | 1,122       | 1,359     | 210        | 210      | 60     | 75      | 100      | 150      |
| Pots, eel .....                    |             |           |            |          | 40     | 40      |          |          |
| Harpoons .....                     | 39          | 174       | 4          | 10       | 13     | 32      | 45       | 90       |
| Dredges .....                      | 128         | 742       | 78         | 191      | 61     | 198     | 59       | 198      |
| Minor apparatus .....              |             | 28        |            | 12       |        |         |          |          |
| Apparatus—shore fisheries:         |             |           |            |          |        |         |          |          |
| Seines .....                       | 15          | 780       | 3          | 520      | 12     | 489     | 21       | 1,580    |
| Gill nets .....                    | 853         | 7,965     | 138        | 2,316    |        |         |          |          |
| Pound nets and trap nets .....     | 81          | 109,940   |            |          | 26     | 12,975  |          |          |
| Dip nets .....                     | 97          | 134       |            |          | 4      | 7       |          |          |
| Fyke nets .....                    | 88          | 1,124     |            |          |        |         |          |          |
| Drag nets .....                    | 21          | 1,260     |            |          |        |         |          |          |
| Lines, hand and trawl .....        |             | 2,905     |            | 279      |        | 139     |          | 231      |
| Pots, lobster .....                | 3,167       | 3,763     | 488        | 488      | 1,714  | 2,089   | 1,650    | 2,203    |
| Pots, eel .....                    | 310         | 410       |            |          | 520    | 1,234   | 280      | 420      |
| Dredges .....                      | 413         | 949       | 122        | 305      | 201    | 603     | 860      | 3,448    |
| Tongs, rakes, and forks .....      |             | 3,289     |            | 60       |        | 327     |          | 615      |
| Minor apparatus .....              |             | 172       |            | 22       |        | 100     |          |          |
| Shore and accessory property ..... |             | 71,273    |            | 5,905    |        | 9,586   |          | 105,653  |
| Cash capital .....                 |             | 33,000    |            |          |        |         |          | 166,500  |
| Total .....                        |             | 608,158   |            | 33,623   |        | 55,506  |          | 333,696  |

a The harpoons, guns, etc., used on whaling vessels are included under "outfit."

Table showing, by counties, the products of the fisheries of Massachusetts in 1898.

| Species.                | Nantucket. |          | Suffolk.   |         | Norfolk. |         | Plymouth. |         |
|-------------------------|------------|----------|------------|---------|----------|---------|-----------|---------|
|                         | Lbs.       | Value.   | Lbs.       | Value.  | Lbs.     | Value.  | Lbs.      | Value.  |
| Alewives, fresh .....   |            |          |            |         |          |         | 122,495   | \$1,357 |
| Alewives, salted .....  |            |          |            |         |          |         | 133,000   | 1,538   |
| Blue-fish .....         | 317,750    | \$12,630 |            |         |          |         |           |         |
| Bonito .....            | 20,600     | 598      |            |         |          |         |           |         |
| Butter-fish .....       |            |          | 2,000      | \$100   |          |         |           |         |
| Cod, fresh .....        | 123,100    | 2,412    | 6,387,900  | 111,405 |          |         | 418,950   | 8,053   |
| Cod, salted .....       | 765,490    | 20,668   | 48,000     | 1,555   |          |         | 28,000    | 1,240   |
| Cunners .....           |            |          | 72,000     | 4,800   |          |         | 5,000     | 200     |
| Cusk, fresh .....       |            |          | 559,300    | 7,004   |          |         | 7,800     | 98      |
| Cusk, salted .....      |            |          | 6,000      | 150     |          |         |           |         |
| Eels .....              | 40,001     | 1,720    |            |         |          |         |           |         |
| Flounders .....         | 12,000     | 360      | 1,500      | 15      |          |         |           |         |
| Haddock, fresh .....    | 80,000     | 2,150    | 11,904,800 | 148,528 |          |         | 355,250   | 5,142   |
| Haddock, salted .....   | 500        | 6        |            |         |          |         |           |         |
| Hake, fresh .....       |            |          | 3,954,827  | 39,502  |          |         | 85,500    | 885     |
| Halibut, fresh .....    |            |          | 694,966    | 80,396  |          |         |           |         |
| Halibut, salted .....   |            |          | 250,000    | 10,000  |          |         |           |         |
| Herring, fresh .....    |            |          | 984,400    | 11,122  | 100,000  | \$1,500 | 170,800   | 1,706   |
| Herring, salted .....   |            |          | 843,600    | 9,300   |          |         |           |         |
| Mackerel, fresh .....   | 13,175     | 586      | 143,500    | 9,080   |          |         | 28,150    | 1,080   |
| Mackerel, salted .....  |            |          | 128,800    | 9,660   |          |         |           |         |
| Menhaden .....          |            |          | 138,000    | 1,040   |          |         |           |         |
| Pollock, fresh .....    |            |          | 297,700    | 2,301   |          |         | 97,300    | 5,015   |
| Pollock, salted .....   | 11,400     | 228      |            |         |          |         |           |         |
| Pompano .....           | 150        | 15       |            |         |          |         |           |         |
| Scup .....              | 7,300      | 396      |            |         |          |         |           |         |
| Squeteague .....        | 2,800      | 84       |            |         |          |         |           |         |
| Sword-fish, fresh ..... | 1,800      | 140      | 142,400    | 11,192  |          |         | 35,500    | 1,715   |
| Lobsters .....          | 37,100     | 3,782    | 346,625    | 30,355  | 48,000   | 4,800   | 498,610   | 39,991  |
| Clams, hard .....       | 6,400      | 640      |            |         |          |         | 24,000    | 2,600   |
| Clams, soft .....       |            |          | 210,600    | 10,530  |          |         | 62,500    | 4,125   |
| Mussels .....           |            |          |            |         |          |         | 7,400     | 130     |
| Oysters .....           |            |          |            |         |          |         | 48,545    | 9,844   |
| Scallops .....          | 138,816    | 13,659   |            |         |          |         | 195,200   | 22,120  |
| Irish moss .....        |            |          |            |         | 150,000  | 4,500   | 550,000   | 17,875  |
| Oil, sea-elephant ..... |            |          | 472,500    | 20,790  |          |         |           |         |
| Oil, whale .....        |            |          | 190,725    | 11,010  |          |         |           |         |
| Total .....             | 1,578,382  | 60,069   | 27,780,143 | 529,835 | 298,000  | 10,800  | 2,874,000 | 124,714 |

Table showing, by counties, the products of the fisheries of Massachusetts in 1898—Cont'd.

| Species.               | Essex.      |           | Dukes.    |         | Bristol.  |         | Barnstable. |         |
|------------------------|-------------|-----------|-----------|---------|-----------|---------|-------------|---------|
|                        | Lbs.        | Value.    | Lbs.      | Value.  | Lbs.      | Value.  | Lbs.        | Value.  |
| Albacore               |             |           |           |         |           |         | 36,090      | \$912   |
| Alewives, fresh        | 106,600     | \$1,013   | 392,561   | \$5,690 | 353,744   | \$4,338 | 901,661     | 9,870   |
| Alewives, salted       |             |           | 10,000    | 150     | 170,000   | 1,975   | 273,700     | 3,127   |
| Alewives, smoked       |             |           | 30,000    | 750     |           |         | 41,440      | 1,480   |
| Blue-fish              | 15          | 1         | 24,660    | 1,239   |           |         | 490,424     | 24,219  |
| Bonito                 |             |           | 49,811    | 1,374   |           |         | 18,725      | 438     |
| Butter-fish            | 2,300       | 83        | 4,600     | 84      |           |         | 21,720      | 551     |
| Cat-fish               | 2,000       | 40        |           |         |           |         | 3,200       | 70      |
| Cod, fresh             | 28,517,742  | 449,174   | 53,140    | 1,176   | 105,231   | 3,021   | 5,026,088   | 113,480 |
| Cod, salted            | 27,274,654  | 619,035   | 28,000    | 1,400   | 491,321   | 9,926   | 2,047,362   | 64,499  |
| Cunners                | 8,350       | 250       |           |         |           |         |             |         |
| Cusk, fresh            | 4,948,673   | 51,112    |           |         |           |         | 309,400     | 3,094   |
| Cusk, salted           | 122,863     | 2,056     |           |         |           |         |             |         |
| Eels                   | 57,000      | 2,850     | 67,790    | 3,016   | 11,000    | 330     | 250,055     | 9,719   |
| Flounders              | 16,875      | 258       | 130,649   | 2,011   | 4,000     | 80      | 1,003,852   | 12,069  |
| Haddock, fresh         | 19,351,974  | 207,893   | 1,000     | 50      | 2,500     | 75      | 3,914,771   | 65,635  |
| Haddock, salted        | 75,386      | 722       |           |         | 51,000    | 510     | 3,344       | 54      |
| Hake, fresh            | 15,625,101  | 110,000   |           |         | 500       | 15      | 1,433,500   | 11,093  |
| Hake, salted           | 140,914     | 1,224     |           |         | 91,474    | 915     |             |         |
| Halibut, fresh         | 7,413,265   | 362,191   |           |         |           |         | 555,212     | 45,127  |
| Halibut, salted        | 1,609,854   | 49,726    |           |         |           |         |             |         |
| Herring, fresh         | 12,641,438  | 220,512   | 9,400     | 87      |           |         | 2,656,300   | 21,408  |
| Herring, salted        | 4,702,199   | 63,552    |           |         |           |         | 255,360     | 3,360   |
| Hickory shad           |             |           |           |         |           |         | 1,000       | 15      |
| King-fish              |             |           | 245       | 22      |           |         |             |         |
| Mackerel, fresh        | 1,848,839   | 107,792   | 65,060    | 3,941   | 147,000   | 6,057   | 1,326,498   | 58,056  |
| Mackerel, salted       | 2,403,181   | 134,091   |           |         | 6,000     | 300     | 374,150     | 20,474  |
| Menhaden               | 551,517     | 4,373     | 6,350     | 40      |           |         | 801,500     | 5,091   |
| Perch                  | 14,500      | 725       | 34,273    | 2,499   | 8,750     | 438     |             |         |
| Pollock, fresh         | 4,382,758   | 25,289    | 200       | 4       | 1,000     | 30      | 1,847,430   | 10,417  |
| Pollock, salted        | 373,113     | 2,906     |           |         | 25,500    | 255     | 107,636     | 1,400   |
| Salmon                 |             |           |           |         |           |         | 60          | 30      |
| Scup                   |             |           | 887,175   | 11,504  | 17,000    | 315     | 132,150     | 2,038   |
| Sea bass               |             |           | 86,300    | 4,366   |           |         | 13,000      | 580     |
| Shad                   | 3,000       | 225       | 445       | 30      | 16,188    | 818     | 9,700       | 353     |
| Smelt                  |             |           | 2,479     | 211     | 4,200     | 254     | 400         | 50      |
| Spanish mackerel       |             |           | 110       | 20      |           |         | 100         | 10      |
| Squeteague             |             |           | 1,209,530 | 36,195  | 24,000    | 960     | 135,580     | 2,279   |
| Striped bass           | 149         | 9         | 420       | 48      | 2,500     | 113     | 9,879       | 769     |
| Sturgeon               |             |           |           |         |           |         | 8,490       | 402     |
| Sword-fish, fresh      | 278,341     | 15,555    | 9,318     | 467     | 16,760    | 1,006   | 85,797      | 4,390   |
| Sword-fish, salted     | 27,000      | 810       | 270       | 5       |           |         |             |         |
| Tautog                 | 1,500       | 58        | 36,113    | 1,091   | 170,300   | 4,895   | 81,592      | 1,523   |
| Whiting                | 8,200       | 57        |           |         |           |         | 29,000      | 435     |
| Squid, fresh           | 312,275     | 9,102     | 11,000    | 153     |           |         | 741,150     | 5,315   |
| Squid, salted          | 5,000       | 50        |           |         |           |         |             |         |
| Lobsters               | 336,207     | 33,646    | 147,634   | 10,649  | 95,812    | 8,909   | 183,753     | 15,570  |
| Shrimp                 |             |           |           |         |           |         | 25,200      | 1,183   |
| Clams, hard            |             |           | 110,400   | 11,295  | 151,280   | 14,791  | 218,456     | 21,398  |
| Clams, soft            | 1,186,240   | 87,242    |           |         |           |         | 11,611      | 697     |
| Oysters                |             |           |           |         | 28,000    | 2,000   | 632,030     | 144,391 |
| Scallops               |             |           | 76,152    | 9,528   | 198,440   | 19,844  | 266,904     | 29,820  |
| Winkles                |             |           |           |         |           |         | 9,500       | 475     |
| Cod sounds and tongues | 34,855      | 889       |           |         |           |         |             |         |
| Hake sounds            | 32,707      | 1,914     |           |         |           |         |             |         |
| Haddock spawn          | 700         | 18        |           |         |           |         |             |         |
| Halibut fins           | 21,900      | 384       |           |         |           |         |             |         |
| Oil, fish              | 305,482     | 11,979    |           |         |           |         | 58,445      | 1,984   |
| Oil, whale             |             |           |           |         | 2,515,836 | 160,537 | 412,889     | 27,476  |
| Whalebone              |             |           |           |         | 27,100    | 65,875  |             |         |
| Total                  | 134,744,667 | 2,578,806 | 3,485,085 | 109,095 | 4,736,436 | 308,582 | 26,761,104  | 741,826 |

## THE FISHERIES BY APPARATUS.

The quantity of products secured in the vessel fisheries of Massachusetts in 1898 was 173,852,873 pounds, valued at \$3,528,985; and by boats in the shore fisheries, 28,404,944 pounds, valued at \$934,742. The forms of apparatus of capture, exclusive of those employed in the whale fisheries, in which the greatest amount of capital is invested and with which the largest quantity and value of products were taken were seines, gill nets, pound nets, and trap nets, hand and trawl lines, lobster and eel pots, and the group including dredges, tongs, rakes, etc.

The following table shows in a condensed manner the pounds and value of products obtained with each form or group of apparatus:

| Apparatus.                    | Vessel fisheries. |           | Shore fisheries. |          | Total.      |           |
|-------------------------------|-------------------|-----------|------------------|----------|-------------|-----------|
|                               | Lbs.              | Value.    | Lbs.             | Value.   | Lbs.        | Value.    |
| Seines.....                   | 20,795,080        | \$521,644 | 1,434,307        | \$27,413 | 22,229,387  | \$549,057 |
| Gill nets.....                | 2,927,435         | 87,548    | 897,030          | 17,712   | 3,824,465   | 105,260   |
| Pound nets and trap nets..... | 124,701           | 4,105     | 10,294,637       | 164,223  | 10,419,338  | 168,328   |
| Dip nets.....                 |                   |           | 2,947,635        | 23,747   | 2,947,635   | 23,747    |
| Fyke nets.....                |                   |           | 59,984           | 2,892    | 59,984      | 2,892     |
| Drag nets.....                | 272,500           | 4,256     | 494,350          | 4,308    | 766,850     | 8,564     |
| Minor apparatus.....          | 316,667           | 9,500     | 168,201          | 9,210    | 484,868     | 18,710    |
| Lines.....                    | 145,003,619       | 2,560,871 | 6,149,280        | 121,842  | 151,152,899 | 2,682,713 |
| Pots.....                     | 85,441            | 7,177     | 1,797,740        | 149,282  | 1,883,181   | 156,459   |
| Harpoons.....                 | 597,186           | 35,280    |                  |          | 597,186     | 35,280    |
| Dredges, tongs, etc.....      | 111,194           | 12,916    | 4,161,780        | 414,113  | 4,272,974   | 427,029   |
| Whaling apparatus.....        | 3,619,050         | 285,688   |                  |          | 3,619,050   | 285,688   |
| Total.....                    | 173,852,873       | 3,528,985 | 28,404,944       | 934,742  | 202,257,817 | 4,463,727 |

Seines were used chiefly in the capture of herring and mackerel, and to some extent for other species. The entire catch was 22,229,387 pounds, valued at \$549,057, of which 20,795,080 pounds, valued at \$521,644, represent the catch by vessels, and 1,434,307 pounds, valued at \$27,413, the catch by boats in the shore fisheries. The catch of herring by vessels with seines was 9,279,397 pounds fresh, valued at \$187,545, and 5,581,559 pounds salted, valued at \$72,747; and of mackerel, 1,650,373 pounds fresh, valued at \$96,480, and 2,633,381 pounds salted, valued at \$147,525. The catch of blue-fish was 137,750 pounds, \$6,564; menhaden, 918,900 pounds, \$5,962; and pollock, 458,860 pounds, \$2,295. The most important species secured with seines in the shore fisheries were alewives, 967,127 pounds fresh, \$12,214, and 234,300 pounds salted, \$3,072; and blue-fish, 122,752 pounds, \$6,138.

Gill nets took 2,927,435 pounds of fish, valued at \$87,548, in the vessel fisheries, and 897,030 pounds, valued at \$17,712, in the shore fisheries; a total of 3,824,465 pounds, valued at \$105,260. The species caught in largest quantities by vessels were blue-fish, 301,950 pounds, \$15,058; cod, 673,900 pounds, \$12,374; herring, 1,012,175 pounds fresh, \$18,691, and 219,600 pounds salted, \$3,465; mackerel, 472,260 pounds fresh, \$27,036, and 167,300 pounds salted, \$9,571. In the shore fisheries the catch consisted principally of blue-fish, 137,190 pounds, \$3,691; herring, 335,000 pounds, \$7,675, and mackerel, 104,840 pounds, \$5,932.

Pound nets and trap nets are set in only four counties, Essex, Suffolk, Barnstable, and Dukes, but the catch consisted of a large variety of species and amounted to 10,419,338 pounds, valued at \$168,328. These apparatus are fished chiefly by the use of small boats, but some of the trap nets were operated by vessels and secured 124,701 pounds of fish, valued at \$4,105. The more prominent species obtained by boats in this fishery were alewives, 204,139 pounds, \$2,110; cod, fresh and salted, 367,662 pounds, \$6,945; flounders, 196,213 pounds, \$3,029; mackerel, fresh and salted, 1,070,973 pounds, \$41,476; herring, 3,758,916 pounds, \$31,829; menhaden, 577,480 pounds, \$4,552; pollock,

fresh and salted, 697,390 pounds, \$4,172; scup, 957,225 pounds, \$12,104; squeteague, 1,277,760 pounds, \$37,595, and squid, 764,150 pounds, \$5,562. The menhaden, squid, and a large part of the herring are utilized for bait by vessels in the cod fisheries.

Hand and trawl lines are by far the most important apparatus used in the fisheries of this State, the yield being larger both in quantity and value than that of all the other means of capture combined. The products of the vessels with lines were 145,003,619 pounds, valued at \$2,560,871, and by boats 6,149,280 pounds, valued at \$121,842, a total of 151,152,899 pounds, valued at \$2,682,713, as compared with 51,104,918 pounds, valued at \$1,781,014, with all other kinds of apparatus. The leading species in the vessel fisheries were cod, 37,349,753 pounds fresh, \$624,924, and 29,573,631 pounds salted, \$684,186; cusk, 5,766,173 pounds fresh, \$60,708, and 128,863 pounds salted, \$2,206; haddock, 34,405,684 pounds fresh, \$403,503, and 128,886 pounds salted, \$1,268; hake, 20,738,703 pounds fresh, \$158,667, and 232,388 pounds salted, \$2,139; halibut, 8,663,428 pounds fresh, \$487,713, and 1,859,854 pounds salted, \$59,726; mackerel, fresh and salted, 420,807 pounds, \$24,925; and pollock, 4,701,338 pounds fresh, \$26,842, and 486,617 pounds salted, \$4,231. In the shore fisheries the same species predominate, in smaller quantities. The most important were cod, 2,234,358 pounds fresh, \$44,501, and 1,090,474 pounds salted, \$33,597; cusk, fresh, 59,000 pounds, \$600; mackerel, fresh, 120,510 pounds, \$5,634; hake, fresh, 351,250 pounds, \$2,733; and pollock, 710,800 pounds fresh, \$4,967, and 29,032 pounds salted, \$538.

Lobster pots were employed in every county having fisheries, while eel pots were less widely distributed. The catch of lobsters by vessels was 70,941 pounds, worth \$6,552, and by boats 1,622,800 pounds, worth \$141,150. There were also secured in lobster pots at Chatham, in Barnstable County, 9,500 pounds (the weight being exclusive of shells), or 950 bushels of winkles, valued at \$475. These are used by the fishermen as bait for cod, and are said to be very good for that purpose. The catch of eels in pots by vessels was 5,000 pounds, valued at \$150, and by boats 174,940 pounds, valued at \$8,132; the total catch with pots being 1,883,181 pounds, valued at \$156,459.

Dredges, tongs, rakes, etc., constituted the means of capture in the molluscan fisheries. About 18,498 bushels of scallops, valued at \$12,866, and oysters to the value of \$50 were obtained by vessels. In the shore or boat fisheries the products secured were scallops, 127,421 bushels, \$82,105; clams, hard, 63,817 bushels, \$50,724; clams, soft, 147,095 bushels, \$102,594; mussels, 700 bushels, \$130; oysters, 101,195 bushels, \$156,185, and Irish moss, 700,000 pounds, \$22,375, the total quantity in pounds, by vessels and boats, being 4,272,974, valued at \$427,029. The mussels and part of the scallops and soft clams were disposed of for bait in the line fisheries.

Large quantities of products were also taken with other forms of



apparatus. Dip nets were used extensively in the alewife and herring fisheries, the yield being 1,127,635 pounds of alewives, fresh, salted, and smoked, valued at \$13,872, and 1,820,000 pounds of herring, fresh, valued at \$9,875. Fyke nets for eels caught 59,984 pounds of that species, worth \$2,892. The catch of minor apparatus of various kinds by vessels was 316,667 pounds of eels and squid, \$9,500, and by boats 168,201 pounds of cunners, eels, flounders, and perch, \$9,210. Drag nets for flounders were fished only in Barnstable County, the catch by vessels being 272,500 pounds, \$4,256, and by boats 494,350 pounds, \$4,308. The catch of sword-fish by vessels with harpoons was 597,186 pounds, \$35,280. The products secured by guns, harpoons, etc., in the whale fisheries consisted of whale oil, including sperm and black-fish oils, 415,927 gallons, \$199,023; sea-elephant oil, 63,000 gallons, \$20,790; and whalebone, 27,100 pounds, \$65,875, a total of 3,619,050 pounds, worth \$285,688. Included in this are the products of vessels from New Bedford, Mass., which sail from San Francisco, Cal.

The following series of tables shows, by counties, species, and apparatus, the quantity and value of the products taken in the vessel and shore fisheries of Massachusetts in 1898:

*Table showing, by counties, the yield of the seine fisheries of Massachusetts in 1898.*

| Species.                            | Essex.            |                | Suffolk.         |               | Plymouth.      |              | Nantucket.     |              |
|-------------------------------------|-------------------|----------------|------------------|---------------|----------------|--------------|----------------|--------------|
|                                     | Lbs.              | Value.         | Lbs.             | Value.        | Lbs.           | Value.       | Lbs.           | Value.       |
| <b>Vessel fisheries:</b>            |                   |                |                  |               |                |              |                |              |
| Blue-fish .....                     |                   |                |                  |               |                |              | 65,000         | \$3,412      |
| Herring, fresh .....                | 8,953,397         | \$183,539      | 164,400          | \$2,676       | 69,800         | \$696        |                |              |
| Herring, salted .....               | 4,482,599         | 60,087         | 843,600          | 9,300         |                |              |                |              |
| Mackerel, fresh .....               | 1,391,978         | 78,654         | 63,500           | 5,080         | 60,000         | 4,800        |                |              |
| Mackerel, salted .....              | 2,220,781         | 122,672        | 128,800          | 9,660         |                |              |                |              |
| Menhaden .....                      | 340,900           | 2,350          |                  |               |                |              |                |              |
| Pollock .....                       | 20,520            | 103            |                  |               |                |              |                |              |
| Oil, fish .....                     | 450               | 18             |                  |               |                |              |                |              |
| <b>Total .....</b>                  | <b>17,410,625</b> | <b>447,423</b> | <b>1,200,300</b> | <b>26,716</b> | <b>129,800</b> | <b>5,496</b> | <b>65,000</b>  | <b>3,412</b> |
| <b>Shore fisheries:</b>             |                   |                |                  |               |                |              |                |              |
| Alewives, fresh .....               |                   |                |                  |               | 50,000         | 600          |                |              |
| Alewives, salted .....              |                   |                |                  |               | 5,600          | 70           |                |              |
| Blue-fish .....                     |                   |                |                  |               |                |              | 110,000        | 5,500        |
| Scup .....                          |                   |                |                  |               |                |              | 1,000          | 30           |
| Squeteague .....                    |                   |                |                  |               |                |              | 1,600          | 48           |
| <b>Total .....</b>                  |                   |                |                  |               | <b>55,600</b>  | <b>670</b>   | <b>112,600</b> | <b>5,578</b> |
| <b>Total vessel and shore .....</b> | <b>17,410,625</b> | <b>447,423</b> | <b>1,200,300</b> | <b>26,716</b> | <b>185,400</b> | <b>6,166</b> | <b>177,600</b> | <b>8,990</b> |

| Species.                 | Barnstable.      |               | Dukes.        |            | Bristol. |        | Total.            |                |
|--------------------------|------------------|---------------|---------------|------------|----------|--------|-------------------|----------------|
|                          | Lbs.             | Value.        | Lbs.          | Value.     | Lbs.     | Value. | Lbs.              | Value.         |
| <b>Vessel fisheries:</b> |                  |               |               |            |          |        |                   |                |
| Blue-fish .....          | 71,750           | \$3,092       | 1,000         | \$60       |          |        | 137,750           | \$6,564        |
| Cod .....                | 21,660           | 433           |               |            |          |        | 21,660            | 433            |
| Eels .....               | 60,000           | 1,300         |               |            |          |        | 60,000            | 1,300          |
| Flounders .....          |                  |               | 10,000        | 125        |          |        | 10,000            | 125            |
| Herring, fresh .....     | 91,800           | 634           |               |            |          |        | 9,279,397         | 187,545        |
| Herring, salted .....    | 255,360          | 3,360         |               |            |          |        | 5,581,559         | 72,747         |
| Mackerel, fresh .....    | 134,895          | 7,946         |               |            |          |        | 1,650,373         | 96,480         |
| Mackerel, salted .....   | 283,800          | 15,193        |               |            |          |        | 2,633,381         | 147,525        |
| Menhaden .....           | 578,000          | 3,612         |               |            |          |        | 918,900           | 5,962          |
| Pollock .....            | 438,340          | 2,192         |               |            |          |        | 458,860           | 2,295          |
| Squeteague .....         |                  |               | 40,000        | 400        |          |        | 40,000            | 400            |
| Striped bass .....       | 2,750            | 250           |               |            |          |        | 2,750             | 250            |
| Oil, fish .....          |                  |               |               |            |          |        | 450               | 18             |
| <b>Total .....</b>       | <b>1,938,355</b> | <b>38,012</b> | <b>51,000</b> | <b>585</b> |          |        | <b>20,795,080</b> | <b>521,644</b> |



# 356 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the yield of the seine fisheries of Massachusetts in 1898—Cont'd.

| Species.                     | Barnstable. |         | Dukes.  |         | Bristol. |         | Total.     |          |
|------------------------------|-------------|---------|---------|---------|----------|---------|------------|----------|
|                              | Lbs.        | Value.  | Lbs.    | Value.  | Lbs.     | Value.  | Lbs.       | Value.   |
| Shore fisheries:             |             |         |         |         |          |         |            |          |
| Alewives, fresh .....        | 273,000     | \$3,111 | 290,383 | \$4,165 | 353,744  | \$4,338 | 967,127    | \$12,214 |
| Alewives, salted .....       | 48,700      | 877     | 10,000  | 150     | 170,000  | 1,975   | 234,300    | 3,072    |
| Blue-fish .....              | 12,752      | 638     |         |         |          |         | 122,752    | 6,138    |
| Cod .....                    |             |         |         |         | 2,500    | 63      | 2,500      | 63       |
| Perch .....                  |             |         | 34,273  | 2,499   | 8,750    | 438     | 43,023     | 2,937    |
| Scup .....                   |             |         |         |         |          |         | 1,000      | 30       |
| Shad .....                   |             |         |         |         | 16,188   | 818     | 16,188     | 818      |
| Smelt .....                  |             |         | 2,479   | 211     | 4,200    | 254     | 6,679      | 465      |
| Squeteague .....             | 6,300       | 126     |         |         |          |         | 7,900      | 174      |
| Striped bass .....           | 3,000       | 240     |         |         |          |         | 3,000      | 240      |
| Tautog .....                 | 3,000       | 45      | 1,638   | 34      |          |         | 4,638      | 79       |
| Shrimp .....                 | 25,200      | 1,183   |         |         |          |         | 25,200     | 1,183    |
| Total .....                  | 371,952     | 6,220   | 338,773 | 7,059   | 555,382  | 7,886   | 1,434,307  | 27,413   |
| Total vessel and shore ..... | 2,310,307   | 44,232  | 389,773 | 7,644   | 555,382  | 7,886   | 22,229,387 | 549,057  |

Table showing, by counties, the yield of the gill-net fisheries of Massachusetts in 1898.

| Species.                     | Essex.    |          | Suffolk. |        | Norfolk. |         | Plymouth. |        |
|------------------------------|-----------|----------|----------|--------|----------|---------|-----------|--------|
|                              | Lbs.      | Value.   | Lbs.     | Value. | Lbs.     | Value.  | Lbs.      | Value. |
| Vessel fisheries:            |           |          |          |        |          |         |           |        |
| Cod .....                    | 631,300   | \$11,567 | 17,500   | \$305  |          |         |           |        |
| Haddock .....                |           |          | 9,400    | 141    |          |         |           |        |
| Herring, fresh .....         | 924,575   | 17,781   |          |        |          |         | 81,000    | \$810  |
| Herring, salted .....        | 219,600   | 3,465    |          |        |          |         |           |        |
| Mackerel, fresh .....        | 101,080   | 11,246   |          |        |          |         | 14,400    | 576    |
| Mackerel, salted .....       | 97,000    | 5,391    |          |        |          |         |           |        |
| Total .....                  | 1,973,555 | 49,450   | 26,900   | 446    |          |         | 95,400    | 1,386  |
| Shore fisheries:             |           |          |          |        |          |         |           |        |
| Herring .....                | 175,000   | 1,575    | 300,000  | 4,000  | 100,000  | \$1,500 | 20,000    | 200    |
| Mackerel .....               | 34,850    | 2,550    |          |        |          |         | 5,200     | 260    |
| Total .....                  | 209,850   | 4,125    | 300,000  | 4,000  | 100,000  | 1,500   | 25,200    | 460    |
| Total vessel and shore ..... | 2,183,405 | 53,575   | 326,900  | 4,446  | 100,000  | 1,500   | 120,600   | 1,846  |

| Species.                     | Barnstable. |          | Nantucket. |         | Dukes. |        | Total.    |          |
|------------------------------|-------------|----------|------------|---------|--------|--------|-----------|----------|
|                              | Lbs.        | Value.   | Lbs.       | Value.  | Lbs.   | Value. | Lbs.      | Value.   |
| Vessel fisheries:            |             |          |            |         |        |        |           |          |
| Blue-fish .....              | 263,350     | \$13,056 | 38,600     | \$2,002 |        |        | 301,950   | \$15,058 |
| Bonito .....                 |             |          | 18,000     | 520     |        |        | 18,000    | 520      |
| Cod .....                    | 25,100      | 502      |            |         |        |        | 673,900   | 12,374   |
| Haddock .....                | 35,200      | 355      |            |         |        |        | 44,600    | 496      |
| Herring, fresh .....         | 6,600       | 100      |            |         |        |        | 1,012,175 | 18,691   |
| Herring, salted .....        |             |          |            |         |        |        | 219,600   | 3,465    |
| Mackerel, fresh .....        | 345,280     | 14,824   | 11,500     | 390     |        |        | 472,260   | 27,036   |
| Mackerel, salted .....       | 70,300      | 4,180    |            |         |        |        | 167,300   | 9,571    |
| Squeteague .....             | 4,800       | 122      |            |         | 12,000 | \$120  | 16,800    | 242      |
| Striped bass .....           | 850         | 95       |            |         |        |        | 850       | 95       |
| Total .....                  | 751,480     | 33,234   | 68,100     | 2,912   | 12,000 | 120    | 2,927,435 | 87,548   |
| Shore fisheries:             |             |          |            |         |        |        |           |          |
| Blue-fish .....              | 47,240      | 2,489    | 89,950     | 1,202   |        |        | 137,190   | 3,691    |
| Bonito .....                 |             |          | 2,600      | 78      |        |        | 2,600     | 78       |
| Herring .....                | 40,000      | 400      |            |         |        |        | 635,000   | 7,675    |
| Mackerel .....               | 63,915      | 2,982    | 875        | 140     |        |        | 104,840   | 5,932    |
| Pompano .....                |             |          | 150        | 15      |        |        | 150       | 15       |
| Squeteague .....             | 4,050       | 105      | 1,200      | 36      |        |        | 5,250     | 141      |
| Tautog .....                 | 12,000      | 180      |            |         |        |        | 12,000    | 180      |
| Total .....                  | 167,205     | 6,156    | 94,775     | 1,471   |        |        | 897,030   | 17,712   |
| Total vessel and shore ..... | 918,685     | 39,390   | 162,875    | 4,383   | 12,000 | 120    | 3,824,465 | 105,260  |

Table showing, by counties, the yield of the pound-net and trap-net fisheries of Massachusetts in 1898.

| Species.                               | Essex.           |               | Suffolk.       |              | Barnstable.      |               | Dukes.           |               | Total.            |                |
|--|------------------|---------------|----------------|--------------|------------------|---------------|------------------|---------------|-------------------|----------------|
|  | Lbs.             | Value.        | Lbs.           | Val.         | Lbs.             | Value.        | Lbs.             | Value.        | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>               |                  |               |                |              |                  |               |                  |               |                   |                |
| Alewives.....                          | 2,000            | \$20          |                |              |                  |               |                  |               | 2,000             | \$20           |
| Butter-fish.....                       | 100              | 5             |                |              |                  |               |                  |               | 100               | 5              |
| Cod.....                               | 1,040            | 16            |                |              |                  |               |                  |               | 1,040             | 16             |
| Cunners.....                           | 100              | 5             |                |              |                  |               |                  |               | 100               | 5              |
| Flounders.....                         | 300              | 9             |                |              |                  |               |                  |               | 300               | 9              |
| Herring.....                           | 56,850           | 720           |                |              |                  |               |                  |               | 56,850            | 720            |
| Mackerel.....                          | 62,920           | 3,285         |                |              |                  |               |                  |               | 62,920            | 3,285          |
| Menhaden.....                          | 987              | 30            |                |              |                  |               |                  |               | 987               | 30             |
| Other fish.....                        | 129              | 7             |                |              |                  |               |                  |               | 129               | 7              |
| Squid.....                             | 275              | 8             |                |              |                  |               |                  |               | 275               | 8              |
| <b>Total.....</b>                      | <b>124,701</b>   | <b>4,105</b>  |                |              |                  |               |                  |               | <b>124,701</b>    | <b>4,105</b>   |
| <b>Shore fisheries:</b>                |                  |               |                |              |                  |               |                  |               |                   |                |
| Albacore.....                          |                  |               |                |              | 36,090           | \$912         |                  |               | 36,090            | 912            |
| Alewives.....                          | 104,600          | 993           |                |              | 77,161           | 784           | 22,378           | \$333         | 204,139           | 2,110          |
| Blue-fish.....                         |                  |               |                |              | 82,920           | 4,286         | 3,160            | 149           | 86,080            | 4,435          |
| Bonito.....                            |                  |               |                |              | 18,725           | 438           | 49,811           | 1,374         | 68,536            | 1,812          |
| Butter-fish.....                       | 2,200            | 78            | 2,000          | \$100        | 21,720           | 551           | 4,600            | 84            | 30,520            | 813            |
| Cod, fresh.....                        | 18,550           | 338           | 13,200         | 264          | 317,050          | 5,802         | 140              | 6             | 348,940           | 6,410          |
| Cod, salted.....                       |                  |               |                |              | 18,722           | 535           |                  |               | 18,722            | 535            |
| Cunners.....                           | 4,000            | 117           |                |              |                  |               |                  |               | 4,000             | 117            |
| Eels.....                              |                  |               |                |              | 37,034           | 1,167         | 2,020            | 119           | 39,054            | 1,286          |
| Flounders.....                         | 10,650           | 113           | 1,500          | 15           | 120,914          | 1,878         | 63,149           | 1,023         | 196,213           | 3,029          |
| Hake.....                              | 9,425            | 94            |                |              |                  |               |                  |               | 9,425             | 94             |
| Herring.....                           | 711,616          | 7,022         | 520,000        | 4,446        | 2,517,900        | 20,274        | 9,400            | 87            | 3,758,916         | 31,829         |
| Hickory shad.....                      |                  |               |                |              | 1,000            | 15            |                  |               | 1,000             | 15             |
| King-fish.....                         |                  |               |                |              |                  |               | 245              | 22            | 245               | 22             |
| Mackerel, fresh.....                   | 196,955          | 9,569         | 80,000         | 4,000        | 776,348          | 26,770        | 11,220           | 762           | 1,064,523         | 41,101         |
| Mackerel, salted.....                  |                  |               |                |              | 6,450            | 375           |                  |               | 6,450             | 375            |
| Menhaden.....                          | 209,630          | 1,993         | 138,000        | 1,040        | 223,500          | 1,479         | 6,350            | 40            | 577,480           | 4,552          |
| Pollock, fresh.....                    | 10,200           | 130           |                |              | 685,190          | 4,022         |                  |               | 695,390           | 4,152          |
| Pollock, salted.....                   |                  |               |                |              | 2,000            | 20            |                  |               | 2,000             | 20             |
| Salmon.....                            |                  |               |                |              | 60               | 30            |                  |               | 60                | 30             |
| Scup.....                              |                  |               |                |              | 108,350          | 1,324         | 848,875          | 10,780        | 957,225           | 12,104         |
| Sea bass.....                          |                  |               |                |              |                  |               | 44,750           | 2,941         | 44,750            | 2,941          |
| Shad.....                              | 3,000            | 225           |                |              | 9,700            | 353           | 445              | 30            | 13,145            | 608            |
| Smelt.....                             |                  |               |                |              | 400              | 50            |                  |               | 400               | 50             |
| Spanish mack-<br>erel.....             |                  |               |                |              | 100              | 10            | 110              | 20            | 210               | 30             |
| Squeteague.....                        |                  |               |                |              | 120,430          | 1,926         | 1,157,330        | 35,669        | 1,277,760         | 37,595         |
| Striped bass.....                      | 100              | 5             |                |              | 1,279            | 84            | 420              | 48            | 1,799             | 137            |
| Sturgeon.....                          |                  |               |                |              | 8,490            | 402           |                  |               | 8,490             | 402            |
| Tautog.....                            | 1,500            | 58            |                |              | 38,250           | 538           | 1,975            | 57            | 41,725            | 653            |
| Whiting.....                           | 8,200            | 57            |                |              | 29,000           | 435           |                  |               | 37,200            | 492            |
| Squid.....                             | 12,000           | 94            |                |              | 741,150          | 5,315         | 11,000           | 153           | 764,150           | 5,562          |
| <b>Total.....</b>                      | <b>1,302,626</b> | <b>20,886</b> | <b>754,700</b> | <b>9,865</b> | <b>5,999,933</b> | <b>79,775</b> | <b>2,237,378</b> | <b>53,697</b> | <b>10,294,637</b> | <b>164,223</b> |
| <b>Total vessel<br/>and shore.....</b> | <b>1,427,327</b> | <b>24,991</b> | <b>754,700</b> | <b>9,865</b> | <b>5,999,933</b> | <b>79,775</b> | <b>2,237,378</b> | <b>53,697</b> | <b>10,419,338</b> | <b>168,328</b> |

Table showing, by counties, the catch by dip nets and fyke nets in Massachusetts in 1898.

| Species.                | Essex.           |              | Plymouth.      |              | Barnstable.    |               | Dukes.         |              | Total.           |               |
|-------------------------|------------------|--------------|----------------|--------------|----------------|---------------|----------------|--------------|------------------|---------------|
|                         | Lbs.             | Val.         | Lbs.           | Val.         | Lbs.           | Val.          | Lbs.           | Val.         | Lbs.             | Val.          |
| <b>Shore fisheries:</b> |                  |              |                |              |                |               |                |              |                  |               |
| <b>Dip nets—</b>        |                  |              |                |              |                |               |                |              |                  |               |
| Alewives, fresh.....    |                  |              | 72,495         | \$757        | 551,500        | \$5,975       | 79,800         | \$1,192      | 703,795          | \$7,924       |
| Alewives, salted.....   |                  |              | 127,400        | 1,468        | 225,000        | 2,250         |                |              | 352,400          | 3,718         |
| Alewives, smoked.....   |                  |              |                |              | 41,440         | 1,480         | 30,000         | 750          | 71,440           | 2,230         |
| Herring.....            | 1,820,000        | \$9,875      |                |              |                |               |                |              | 1,820,000        | 9,875         |
| <b>Total.....</b>       | <b>1,820,000</b> | <b>9,875</b> | <b>199,895</b> | <b>2,225</b> | <b>817,940</b> | <b>9,705</b>  | <b>109,800</b> | <b>1,942</b> | <b>2,947,635</b> | <b>23,747</b> |
| <b>Fyke nets—</b>       |                  |              |                |              |                |               |                |              |                  |               |
| Eels.....               |                  |              |                |              | 59,984         | 2,892         |                |              | 59,984           | 2,892         |
| <b>Grand total.....</b> | <b>1,820,000</b> | <b>9,875</b> | <b>199,895</b> | <b>2,225</b> | <b>877,924</b> | <b>12,597</b> | <b>109,800</b> | <b>1,942</b> | <b>3,007,619</b> | <b>26,639</b> |

# 358 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the catch by minor apparatus in Massachusetts in 1898.

| Species.                  | Suffolk. |         | Plymouth.  |        | Barnstable. |         | Dukes. |        |
|---------------------------|----------|---------|------------|--------|-------------|---------|--------|--------|
|                           | Lbs.     | Value.  | Lbs.       | Value. | Lbs.        | Value.  | Lbs.   | Value. |
| Shore fisheries:          |          |         |            |        |             |         |        |        |
| Cunners.....              | 72,000   | \$4,800 | 5,000      | \$200  | 33,867      | \$1,745 | 12,000 | \$360  |
| Eels.....                 |          |         |            |        |             |         |        |        |
| <hr/>                     |          |         |            |        |             |         |        |        |
| Species.                  | Essex.   |         | Nantucket. |        | Total.      |         |        |        |
|                           | Lbs.     | Value.  | Lbs.       | Value. | Lbs.        | Value.  |        |        |
| Vessel fisheries:         |          |         |            |        |             |         |        |        |
| Eels.....                 | 1,000    | \$50    | 10,667     | \$400  | 11,667      | \$450   |        |        |
| Squid, fresh.....         | 300,000  | 9,000   |            |        | 300,000     | 9,000   |        |        |
| Squid, salted.....        | 5,000    | 50      |            |        | 5,000       | 50      |        |        |
| Total.....                | 306,000  | 9,100   | 10,667     | 400    | 316,667     | 9,500   |        |        |
| Shore fisheries:          |          |         |            |        |             |         |        |        |
| Cunners.....              |          |         |            |        | 77,000      | 5,000   |        |        |
| Eels.....                 |          |         | 29,334     | 1,320  | 75,201      | 3,425   |        |        |
| Flounders.....            | 1,500    | 60      |            |        | 1,500       | 60      |        |        |
| Perch.....                | 14,500   | 725     |            |        | 14,500      | 725     |        |        |
| Total.....                | 16,000   | 785     | 29,334     | 1,320  | 168,201     | 9,210   |        |        |
| Total vessel and shore... | 322,000  | 9,885   | 40,001     | 1,720  | 484,868     | 18,710  |        |        |

Table showing the yield of the hand and trawl line fisheries of Massachusetts in 1898.

| Species.                    | Essex.      |           | Suffolk.   |           | Plymouth. |         | Nantucket. |        |
|-----------------------------|-------------|-----------|------------|-----------|-----------|---------|------------|--------|
|                             | Lbs.        | Value.    | Lbs.       | Value.    | Lbs.      | Val.    | Lbs.       | Value. |
| Vessel fisheries:           |             |           |            |           |           |         |            |        |
| Blue-fish.....              |             |           |            |           |           |         | 14,200     | \$514  |
| Cat-fish.....               | 2,000       | \$40      |            |           |           |         |            |        |
| Cod, fresh.....             | 26,522,752  | 414,371   | 6,357,200  | \$110,836 | 343,950   | \$6,403 | 118,100    | 2,312  |
| Cod, salted.....            | 27,274,654  | 619,035   | 48,000     | 1,555     |           |         | 10,740     | 315    |
| Cusk, fresh.....            | 4,889,673   | 50,512    | 559,300    | 7,004     | 7,800     | 98      |            |        |
| Cusk, salted.....           | 122,863     | 2,056     | 6,000      | 150       |           |         |            |        |
| Flounders.....              | 925         | 6         |            |           |           |         |            |        |
| Haddock, fresh.....         | 18,823,974  | 201,106   | 11,895,400 | 148,387   | 338,250   | 4,852   | 30,000     | 900    |
| Haddock, salted.....        | 75,386      | 722       |            |           |           |         | 500        | 6      |
| Hake, fresh.....            | 15,347,376  | 107,672   | 3,954,827  | 39,502    | 85,500    | 885     |            |        |
| Hake, salted.....           | 140,914     | 1,224     |            |           |           |         |            |        |
| Halibut, fresh.....         | 7,413,250   | 362,190   | 694,966    | 80,396    |           |         |            |        |
| Halibut, salted.....        | 1,609,854   | 49,726    | 250,000    | 10,000    |           |         |            |        |
| Mackerel, fresh.....        | 54,806      | 1,988     |            |           | 550       | 44      | 800        | 56     |
| Mackerel, salted.....       | 85,400      | 6,028     |            |           |           |         |            |        |
| Pollock, fresh.....         | 3,751,238   | 20,639    | 297,700    | 2,301     | 27,300    | 165     |            |        |
| Pollock, salted.....        | 373,113     | 2,906     |            |           |           |         | 400        | 8      |
| Scup.....                   |             |           |            |           |           |         | 300        | 6      |
| Cod sounds and tongues..... | 34,855      | 889       |            |           |           |         |            |        |
| Hake sounds.....            | 32,707      | 1,914     |            |           |           |         |            |        |
| Haddock spawn.....          | 700         | 18        |            |           |           |         |            |        |
| Halibut fins.....           | 21,900      | 384       |            |           |           |         |            |        |
| Oil, fish.....              | 305,032     | 11,961    |            |           |           |         |            |        |
| Total.....                  | 106,883,372 | 1,855,387 | 24,063,393 | 400,131   | 803,350   | 12,447  | 175,040    | 4,117  |
| Shore fisheries:            |             |           |            |           |           |         |            |        |
| Cod, fresh.....             | 1,344,100   | 22,882    |            |           | 75,000    | 1,650   | 5,000      | 100    |
| Cod, salted.....            |             |           |            |           | 28,000    | 1,240   | 754,750    | 20,348 |
| Cunners.....                | 4,250       | 128       |            |           |           |         |            |        |
| Cusk.....                   | 59,000      | 600       |            |           |           |         |            |        |
| Flounders.....              | 3,500       | 70        |            |           |           |         | 12,000     | 360    |
| Haddock, fresh.....         | 528,000     | 6,787     |            |           | 17,000    | 290     | 50,000     | 1,250  |
| Hake.....                   | 268,250     | 2,233     |            |           |           |         |            |        |
| Mackerel.....               | 6,250       | 500       |            |           | 8,000     | 200     |            |        |
| Pollock, fresh.....         | 600,800     | 4,417     |            |           | 10,000    | 50      |            |        |
| Pollock, salted.....        |             |           |            |           |           |         | 11,000     | 220    |
| Scup.....                   |             |           |            |           |           |         | 6,000      | 360    |
| Total.....                  | 2,814,150   | 37,617    |            |           | 138,000   | 3,430   | 838,750    | 22,638 |
| Vessel and shore.....       | 109,697,522 | 1,893,004 | 24,063,393 | 400,131   | 941,350   | 15,877  | 1,013,790  | 26,755 |

Table showing yield of hand and trawl line fisheries of Massachusetts in 1898—Continued.

| Species.                                | Barnstable.       |                | Dukes.         |               | Bristol.         |               | Total.             |                  |
|---|-------------------|----------------|----------------|---------------|------------------|---------------|--------------------|------------------|
|   | Lbs.              | Value.         | Lbs.           | Value.        | Lbs.             | Value.        | Lbs.               | Value.           |
| <b>Vessel fisheries:</b>                |                   |                |                |               |                  |               |                    |                  |
| Blue-fish .....                         | 1,200             | \$60           | 500            | \$30          | .....            | .....         | 15,900             | \$604            |
| Cat-fish .....                          | 3,200             | 70             | .....          | .....         | .....            | .....         | 5,200              | 110              |
| Cod, fresh .....                        | 3,904,420         | 87,922         | 28,000         | 670           | 75,331           | \$2,410       | 37,349,753         | 624,924          |
| Cod, salted .....                       | 1,746,916         | 53,245         | 7,000          | 310           | 486,321          | 9,726         | 29,573,631         | 684,186          |
| Cusk, fresh .....                       | 309,400           | 3,094          | .....          | .....         | .....            | .....         | 5,766,173          | 60,708           |
| Cusk, salted .....                      | .....             | .....          | .....          | .....         | .....            | .....         | 128,863            | 2,206            |
| Flounders .....                         | 4,800             | 80             | .....          | .....         | 700              | 14            | 6,425              | 100              |
| Haddock, fresh .....                    | 3,314,560         | 48,133         | 1,000          | 50            | 2,500            | 75            | 34,405,684         | 403,503          |
| Haddock, salted .....                   | 2,000             | 30             | .....          | .....         | 51,000           | 510           | 128,886            | 1,268            |
| Hake, fresh .....                       | 1,350,500         | 10,593         | .....          | .....         | 500              | 15            | 20,738,703         | 158,667          |
| Hake, salted .....                      | .....             | .....          | .....          | .....         | 91,474           | 915           | 232,388            | 2,139            |
| Halibut, fresh .....                    | 555,212           | 45,127         | .....          | .....         | .....            | .....         | 8,663,428          | 487,713          |
| Halibut, salted .....                   | .....             | .....          | .....          | .....         | .....            | .....         | 1,859,854          | 59,726           |
| Mackerel, fresh .....                   | 159,011           | 10,947         | 28,640         | 1,779         | 72,000           | 3,057         | 315,807            | 17,871           |
| Mackerel, salted .....                  | 13,600            | 726            | .....          | .....         | 6,000            | 300           | 105,000            | 7,054            |
| Pollock, fresh .....                    | 623,900           | 3,703          | 200            | 4             | 1,000            | 30            | 4,701,338          | 26,842           |
| Pollock, salted .....                   | 87,604            | 1,062          | .....          | .....         | 25,500           | 255           | 486,617            | 4,231            |
| Scup .....                              | 7,100             | 174            | 9,300          | 109           | 5,000            | 75            | 21,700             | 364              |
| Sea bass .....                          | 6,500             | 250            | 18,200         | 496           | .....            | .....         | 24,700             | 746              |
| Tautog .....                            | 6,930             | 154            | .....          | .....         | 22,500           | 725           | 29,430             | 879              |
| Cod sounds and<br>tongues .....         | .....             | .....          | .....          | .....         | .....            | .....         | 34,855             | 889              |
| Hake sounds .....                       | .....             | .....          | .....          | .....         | .....            | .....         | 32,707             | 1,914            |
| Haddock spawn .....                     | .....             | .....          | .....          | .....         | .....            | .....         | 700                | 18               |
| Halibut fins .....                      | .....             | .....          | .....          | .....         | .....            | .....         | 21,900             | 384              |
| Oil, fish .....                         | 48,945            | 1,864          | .....          | .....         | .....            | .....         | 353,977            | 13,825           |
| <b>Total .....</b>                      | <b>12,145,798</b> | <b>267,234</b> | <b>92,840</b>  | <b>3,448</b>  | <b>839,826</b>   | <b>18,107</b> | <b>145,003,619</b> | <b>2,560,871</b> |
| <b>Shore fisheries:</b>                 |                   |                |                |               |                  |               |                    |                  |
| Blue-fish .....                         | 11,212            | 598            | 20,000         | 1,000         | .....            | .....         | 31,212             | 1,598            |
| Cod, fresh .....                        | 757,858           | 18,821         | 25,000         | 500           | 27,400           | 548           | 2,234,358          | 44,501           |
| Cod, salted .....                       | 281,724           | 10,719         | 21,000         | 1,090         | 5,000            | 200           | 1,090,474          | 33,597           |
| Cunners .....                           | .....             | .....          | .....          | .....         | .....            | .....         | 4,250              | 128              |
| Cusk .....                              | .....             | .....          | .....          | .....         | .....            | .....         | 59,000             | 600              |
| Flounders .....                         | 111,288           | 1,547          | 57,500         | 863           | 3,300            | 66            | 187,588            | 2,906            |
| Haddock, fresh .....                    | 406,000           | 6,200          | .....          | .....         | .....            | .....         | 1,001,000          | 14,527           |
| Haddock, salted .....                   | 1,344             | 24             | .....          | .....         | .....            | .....         | 1,344              | 24               |
| Hake .....                              | 83,000            | 500            | .....          | .....         | .....            | .....         | 351,250            | 2,733            |
| Mackerel .....                          | 6,060             | 534            | 25,200         | 1,400         | 75,000           | 3,000         | 120,510            | 5,634            |
| Pollock, fresh .....                    | 100,000           | 500            | .....          | .....         | .....            | .....         | 710,800            | 4,967            |
| Pollock, salted .....                   | 18,032            | 318            | .....          | .....         | .....            | .....         | 29,032             | 538              |
| Scup .....                              | 16,700            | 540            | 29,000         | 615           | 12,000           | 240           | 63,700             | 1,755            |
| Sea bass .....                          | 6,500             | 330            | 23,350         | 929           | .....            | .....         | 29,850             | 1,259            |
| Squeteague .....                        | .....             | .....          | 200            | 6             | 24,000           | 960           | 24,200             | 966              |
| Striped bass .....                      | 2,000             | 100            | .....          | .....         | 2,500            | 113           | 4,500              | 213              |
| Tautog .....                            | 21,412            | 606            | 32,500         | 1,000         | 147,800          | 4,170         | 201,712            | 5,776            |
| Oil, fish .....                         | 4,500             | 120            | .....          | .....         | .....            | .....         | 4,500              | 120              |
| <b>Total .....</b>                      | <b>1,827,630</b>  | <b>41,457</b>  | <b>233,750</b> | <b>7,403</b>  | <b>297,000</b>   | <b>9,297</b>  | <b>6,149,280</b>   | <b>121,842</b>   |
| <b>Total vessel and<br/>shore .....</b> | <b>13,973,428</b> | <b>308,691</b> | <b>326,590</b> | <b>10,851</b> | <b>1,136,826</b> | <b>27,404</b> | <b>151,152,899</b> | <b>2,682,713</b> |

Table showing the catch of flounders by drag nets in Barnstable County in 1898.

| Fisheries.         | Lbs.           | Value.       |
|--------------------|----------------|--------------|
| Vessel .....       | 272,500        | \$4,256      |
| Shore .....        | 494,350        | 4,308        |
| <b>Total .....</b> | <b>766,850</b> | <b>8,564</b> |

# 360 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the catch by lobster and eel pots in Massachusetts in 1898.

| Species.                  | Essex.  |         | Suffolk. |          | Norfolk. |         | Plymouth. |          |
|---------------------------|---------|---------|----------|----------|----------|---------|-----------|----------|
|                           | Lbs.    | Value.  | Lbs.     | Value.   | Lbs.     | Value.  | Lbs.      | Value.   |
| Vessel fisheries:         |         |         |          |          |          |         |           |          |
| Lobsters .....            | 10,200  | \$1,224 |          |          |          |         |           |          |
| Shore fisheries:          |         |         |          |          |          |         |           |          |
| Eels .....                | 56,000  | 2,800   |          |          |          |         |           |          |
| Lobsters .....            | 326,007 | 32,422  | 346,625  | \$30,355 | 48,000   | \$4,800 | 498,610   | \$39,991 |
| Total .....               | 382,007 | 35,222  | 346,625  | 30,355   | 48,000   | 4,800   | 498,610   | 39,991   |
| Total vessel and shore... | 392,207 | 36,446  | 346,625  | 30,355   | 48,000   | 4,800   | 498,610   | 39,991   |

| Species.                  | Barnstable. |         | Nantucket. |        | Dukes.  |        | Bristol. |        | Total.    |         |
|---------------------------|-------------|---------|------------|--------|---------|--------|----------|--------|-----------|---------|
|                           | Lbs.        | Value.  | Lbs.       | Value. | Lbs.    | Value. | Lbs.     | Value. | Lbs.      | Value.  |
| Vessel fisheries:         |             |         |            |        |         |        |          |        |           |         |
| Eels .....                |             |         |            |        | 5,000   | \$150  |          |        | 5,000     | \$150   |
| Lobsters .....            | 41,100      | \$3,730 | 7,500      | \$750  | 4,000   | 360    | 8,141    | \$488  | 70,941    | 6,552   |
| Winkles .....             | 9,500       | 475     |            |        |         |        |          |        | 9,500     | 475     |
| Total .....               | 50,600      | 4,205   | 7,500      | 750    | 9,000   | 510    | 8,141    | 488    | 85,441    | 7,177   |
| Shore fisheries:          |             |         |            |        |         |        |          |        |           |         |
| Eels .....                | 59,170      | 2,615   |            |        | 48,770  | 2,387  | 11,000   | 330    | 174,940   | 8,132   |
| Lobsters .....            | 142,653     | 11,840  | 29,600     | 3,032  | 143,634 | 10,289 | 87,671   | 8,421  | 1,622,800 | 141,150 |
| Total .....               | 201,823     | 14,455  | 29,600     | 3,032  | 192,404 | 12,676 | 98,671   | 8,751  | 1,797,740 | 149,282 |
| Total vessel and shore... | 252,423     | 18,660  | 37,100     | 3,782  | 201,404 | 13,186 | 106,812  | 9,239  | 1,883,181 | 156,495 |

Table showing, by counties, the catch by dredges, tongs, rakes, and forks in Massachusetts in 1898.

| Species.          | Essex.    |          | Suffolk. |          | Norfolk. |         | Plymouth. |         |
|-------------------|-----------|----------|----------|----------|----------|---------|-----------|---------|
|                   | Lbs.      | Value.   | Lbs.     | Value.   | Lbs.     | Value.  | Lbs.      | Value.  |
| Shore fisheries:  |           |          |          |          |          |         |           |         |
| Clams, hard ..... |           |          |          |          |          |         | 24,000    | \$2,600 |
| Clams, soft ..... | 1,186,240 | \$87,242 | 210,600  | \$10,530 |          |         | 62,500    | 4,125   |
| Mussels .....     |           |          |          |          |          |         | 7,400     | 130     |
| Oysters .....     |           |          |          |          |          |         | 48,545    | 9,844   |
| Scallops .....    |           |          |          |          |          |         | 195,200   | 22,120  |
| Irish moss .....  |           |          |          |          | 150,000  | \$4,500 | 550,000   | 17,875  |
| Total .....       | 1,186,240 | 87,242   | 210,600  | 10,530   | 150,000  | 4,500   | 887,645   | 56,694  |

| Species.                  | Barnstable. |         | Nantucket. |         | Dukes.  |         | Bristol. |         | Total.    |         |
|---------------------------|-------------|---------|------------|---------|---------|---------|----------|---------|-----------|---------|
|                           | Lbs.        | Value.  | Lbs.       | Value.  | Lbs.    | Value.  | Lbs.     | Value.  | Lbs.      | Value.  |
| Vessel fisheries:         |             |         |            |         |         |         |          |         |           |         |
| Oysters .....             | 210         | \$50    |            |         |         |         |          |         | 210       | \$50    |
| Scallops .....            | 50,912      | 6,123   | 36,480     | \$4,071 | 12,152  | \$1,528 | 11,440   | \$1,144 | 110,984   | 12,866  |
| Total .....               | 51,122      | 6,173   | 36,480     | 4,071   | 12,152  | 1,528   | 11,440   | 1,144   | 111,194   | 12,916  |
| Shore fisheries:          |             |         |            |         |         |         |          |         |           |         |
| Clams, hard .....         | 218,456     | 21,398  | 6,400      | 640     | 110,400 | 11,295  | 151,280  | 14,791  | 510,536   | 50,724  |
| Clams, soft .....         | 11,611      | 697     |            |         |         |         |          |         | 1,470,951 | 102,594 |
| Mussels .....             |             |         |            |         |         |         |          |         | 7,400     | 130     |
| Oysters .....             | 631,820     | 144,341 |            |         |         |         | 28,000   | 2,000   | 708,365   | 156,185 |
| Scallops .....            | 215,992     | 23,697  | 102,336    | 9,588   | 64,000  | 8,000   | 187,000  | 18,700  | 764,528   | 82,105  |
| Irish moss .....          |             |         |            |         |         |         |          |         | 700,000   | 22,375  |
| Total .....               | 1,077,879   | 190,133 | 108,736    | 10,228  | 174,400 | 19,295  | 366,280  | 35,491  | 4,161,780 | 414,113 |
| Total vessel and shore .. | 1,129,001   | 196,306 | 145,216    | 14,299  | 186,552 | 20,823  | 377,720  | 36,635  | 4,272,974 | 427,029 |

Table showing, by counties, the products of the whale fisheries of Massachusetts in 1898.

| Species.           | Suffolk. |          | Barnstable. |          | Bristol.  |           | Total.    |           |
|--------------------|----------|----------|-------------|----------|-----------|-----------|-----------|-----------|
|                    | Lbs.     | Value.   | Lbs.        | Value.   | Lbs.      | Value.    | Lbs.      | Value.    |
| Vessel fisheries:  |          |          |             |          |           |           |           |           |
| Oil, whale.....    | 190,725  | \$11,010 | 412,889     | \$27,476 | 2,515,836 | \$160,537 | 3,119,450 | \$199,023 |
| Oil, sea-elephant. | 472,500  | 20,790   |             |          |           |           | 472,500   | 20,790    |
| Whalebone.....     |          |          |             |          | 27,100    | 65,875    | 27,100    | 65,875    |
| Total.....         | 668,225  | 31,800   | 412,889     | 27,476   | 2,542,936 | 226,412   | 3,619,050 | 285,688   |

Table showing, by counties, the catch of sword-fish by harpoons in the vessel fisheries of Massachusetts in 1898.

| Counties.       | Fresh.  |          | Salted. |        | Total.  |          |
|-----------------|---------|----------|---------|--------|---------|----------|
|                 | Lbs.    | Value.   | Lbs.    | Value. | Lbs.    | Value.   |
| Essex.....      | 278,341 | \$15,555 | 27,000  | \$810  | 305,341 | \$16,365 |
| Suffolk.....    | 142,400 | 11,192   |         |        | 142,400 | 11,192   |
| Plymouth.....   | 35,500  | 1,715    |         |        | 35,500  | 1,715    |
| Barnstable..... | 85,797  | 4,390    |         |        | 85,797  | 4,390    |
| Nantucket.....  | 1,800   | 140      |         |        | 1,800   | 140      |
| Dukes.....      | 9,318   | 467      | 270     | 5      | 9,588   | 472      |
| Bristol.....    | 16,760  | 1,006    |         |        | 16,760  | 1,006    |
| Total.....      | 569,916 | 34,465   | 27,270  | 815    | 597,186 | 35,280   |

## - WHOLESALE FISHERY TRADE OF BOSTON AND GLOUCESTER.

The wholesale trade in fishery products in Massachusetts centers chiefly at Boston and Gloucester. These two cities are also the principal receiving and distributing points for fishery products in the New England States.

Boston is especially important as a fresh-fish market, but large quantities of salted, smoked, and canned fish, oysters, lobsters, and other products are also handled. The supply is derived from a variety of sources. The ocean species, disposed of in a fresh and salted condition, and as otherwise prepared, are caught and landed chiefly by the fleet of vessels owned at Boston, and by vessels from Gloucester and Provincetown, Mass., and from Portland, Me., and other localities on the New England coast. Large quantities of fish are received from other sections of the Atlantic coast, and from the Great Lakes, the Gulf of Mexico, and the Pacific coast. There is also a considerable quantity of fishery products of various kinds imported from the British provinces and from a number of European countries.

The number of firms in the various branches of the wholesale fishery trade of Boston in 1898 was 93; the number of persons engaged as proprietors, managers, and employees, 1,086; the amount of wages paid, \$601,593; and the investment in shore property and cash capital, \$4,029,060. The products sold consisted of fresh fish, 111,212,669 pounds, \$4,118,922; salted fish, including boneless, 25,926,505 pounds, \$1,150,185; smoked fish, 3,659,750 pounds, \$235,614; lobsters, fresh, cooked, and pickled, 9,096,572 pounds, \$1,239,210; canned fish, 105,669 cases, \$442,205; and a large quantity of other products, including oys-



ters, clams, quahogs, scallops, fish oil, glue, etc., valued at \$1,764,518; the total value of the trade being \$8,951,653.

In comparing the statistics of this trade for 1889 and 1898, so far as such a comparison is practicable, it should be remembered that the business done by firms handling fish on commission was included in the former year, but not in the latter. The data for 1898 show a considerable increase in the quantity and value of fresh fish, but a decrease in some of the other products; the total value of the trade being \$2,148,606 less than in 1889.

Gloucester is one of the most important fish-producing centers in the United States, but its wholesale fishery trade is much less extensive than that of Boston. It consists principally in the preparation and distribution of salted and smoked fish and a large variety of secondary products, such as fish oil, glue, isinglass, and fertilizer. In December, 1897, the fresh-fish business, which has now become an important feature of the fishery trade at Gloucester, was established and carried on by a company known as "The Gloucester Fresh Fish Company." Prior to that time halibut was almost the only food species handled extensively in a fresh condition. The greater part of the fish utilized in all branches of the fishery trade at Gloucester is caught and landed by vessels owned there. A limited quantity is also obtained from other sources.

The number of firms in the wholesale trade in 1898 was 59. There were 4 firms in the fresh-fish business, 39 in the salted, smoked, and boneless fish trades, 10 in the manufacturing of fish oil, glue, isinglass, and fertilizer, and 6 in box-making and other related industries. The number of persons engaged in the trade, as proprietors and employees, was 1,425; the amount of wages paid, \$574,342; and the investment in shore property and cash capital, \$3,055,776. The products embraced fresh fish, 28,229,677 pounds, \$793,505; salted fish 26,131,752 pounds, \$1,011,177; boneless fish prepared from the salted fish and stated separately on account of the importance of the quantity and value, 24,680,404 pounds, \$1,356,796; smoked fish, 4,796,794 pounds, \$220,047; and other products, including canned fish, fish oil, glue, isinglass, fertilizer, etc., 19,176,774 pounds, \$705,456; the total quantity of products handled in all branches of the trade being 103,015,401 pounds, having a value of \$4,086,981.

There was a decrease in the total products of the trade in 1898, as compared with 1889, of 15,160,990 pounds in quantity and \$1,534,175 in value. The fresh, smoked, and canned fish, glue, isinglass, and fertilizer products have increased, but the quantity of salted and boneless fish decreased 42,021,835 pounds and the value \$1,825,311. There was also a slight decrease in the quantity and value of fish oil.

The extent of the wholesale fishery trade of Boston and Gloucester is presented in the following tables for the year 1898.

*Extent of the wholesale fishery trade of Boston in 1898.*

| Branches of trade.                 | No. of firms. | Persons engaged.  |         |                  |        | Wages paid. | Shore property. | Cash capital. |
|------------------------------------|---------------|-------------------|---------|------------------|--------|-------------|-----------------|---------------|
|                                    |               | Proprietors, etc. | Clerks. | Other employees. | Total. |             |                 |               |
| Fresh fish .....                   | 41            | 71                | 62      | 203              | 336    | \$232, 270  | \$930, 000      | \$928, 900    |
| Salted, canned, and smoked fish .. | 17            | 19                | 67      | 299              | 385    | 159, 220    | 547, 360        | 322, 600      |
| Oyster .....                       | 18            | 24                | 21      | 106              | 151    | 75, 660     | 325, 300        | 252, 650      |
| Lobster .....                      | 11            | 15                | 12      | 42               | 69     | 45, 606     | 170, 450        | 93, 000       |
| Fish oil and glue.....             | 6             | 9                 | 29      | 107              | 145    | 88, 837     | 254, 200        | 205, 500      |
| Total.....                         | 93            | 138               | 191     | 757              | 1, 086 | 601, 593    | 2, 227, 310     | 1, 801, 750   |

| Products sold.             | Quantity.     | Value.        | Products sold.              | Quantity.   | Value.      |
|----------------------------|---------------|---------------|-----------------------------|-------------|-------------|
| Fresh fish .....pounds..   | 111, 212, 669 | \$4, 118, 922 | Oysters.....bush..          | 160, 858    | \$264, 698  |
| Salted fish .....do..      | 25, 199, 005  | 1, 077, 585   | Oysters.....galls..         | 627, 627    | 660, 759    |
| Smoked fish .....do..      | 3, 659, 750   | 235, 614      | Clams.....bush..            | 73, 047     | 81, 548     |
| Boneless fish .....do..    | 727, 500      | 72, 600       | Clams.....galls..           | 99, 506     | 50, 053     |
| Lobsters, fresh .....do..  | 5, 425, 205   | 688, 505      | Quahogs.....bush..          | 8, 567      | 12, 294     |
| Lobsters, cooked .....do.. | 3, 634, 701   | 545, 205      | Fish oils and glue..galls.. | 1, 546, 562 | 547, 980    |
| Lobsters, pickled.....do.. | 36, 666       | 5, 500        | Other products.....         |             | 97, 064     |
| Canned fish .....cases..   | 105, 669      | 442, 205      |                             |             |             |
| Scallops .....galls..      | 51, 443       | 51, 121       | Total.....                  |             | 8, 951, 653 |

*Extent of the wholesale fishery trade and related industries of Gloucester in 1898.*

| Branches of trade.               | Number of firms. | Persons engaged. |         |             |        | Wages paid. | Shore property. | Cash capital. |
|----------------------------------|------------------|------------------|---------|-------------|--------|-------------|-----------------|---------------|
|                                  |                  | Proprietors.     | Clerks. | All others. | Total. |             |                 |               |
| Fresh fish .....                 | 4                | 7                | 20      | 87          | 114    | \$49, 241   | \$147, 674      | \$112, 000    |
| Salted, smoked, and boneless ... | 39               | 66               | 90      | 801         | 957    | 400, 766    | 1, 019, 502     | 804, 500      |
| Oil, glue, and isinglass a ..... | 10               | 20               | 17      | 234         | 271    | 80, 035     | 283, 900        | 363, 500      |
| Related industries .....         | 6                | 10               | 6       | 67          | 83     | 44, 300     | 258, 700        | 66, 000       |
| Total.....                       | 59               | 103              | 133     | 1, 189      | 1, 425 | 574, 342    | 1, 709, 776     | 1, 346, 000   |

| Products sold.                   | Lbs.         | Value.      | Products sold.         | Lbs.          | Value.      |
|----------------------------------|--------------|-------------|------------------------|---------------|-------------|
| Fresh:                           |              |             | Salted:                |               |             |
| Blue-fish.....                   | 20, 153      | \$1, 008    | Cod.....               | 10, 068, 936  | 356, 146    |
| Cat-fish.....                    | 62, 151      | 1, 392      | Cusk.....              | 616, 503      | 20, 893     |
| Cod.....                         | 4, 928, 327  | 147, 850    | Eels.....              | 10, 000       | 550         |
| Cusk.....                        | 349, 771     | 5, 306      | Haddock.....           | 946, 514      | 29, 025     |
| Flounders.....                   | 31, 828      | 339         | Hake.....              | 3, 170, 961   | 64, 062     |
| Haddock.....                     | 6, 328, 684  | 80, 805     | Herring.....           | 4, 382, 535   | 93, 008     |
| Hake.....                        | 2, 854, 450  | 43, 939     | Mackerel.....          | 5, 251, 190   | 396, 994    |
| Halibut.....                     | 4, 309, 345  | 271, 253    | Pollock.....           | 1, 353, 312   | 32, 535     |
| Herring.....                     | 6, 123, 571  | 147, 774    | Salmon.....            | 210, 200      | 11, 831     |
| Mackerel.....                    | 667, 218     | 48, 943     | Sword-fish.....        | 31, 588       | 1, 679      |
| Pollock.....                     | 2, 340, 890  | 31, 551     | Trout.....             | 54, 200       | 2, 802      |
| Rose fish or Norway haddock..... | 40, 100      | 602         | Halibut fins.....      | 30, 813       | 1, 527      |
| Shad.....                        | 3, 120       | 250         | Squid.....             | 5, 000        | 125         |
| Sword-fish.....                  | 160, 152     | 11, 452     |                        |               |             |
| Lobsters.....                    | 9, 917       | 1, 041      | Total.....             | 26, 131, 752  | 1, 011, 177 |
| Total.....                       | 28, 229, 677 | 793, 505    |                        |               |             |
| Boneless:                        |              |             | Other products:        |               |             |
| Cod.....                         | 17, 185, 142 | 1, 070, 174 | Canned fish.....       | 132, 104      | 9, 438      |
| Cusk.....                        | 1, 070, 626  | 65, 478     | Herring spiced.....    | 5, 000        | 425         |
| Hake.....                        | 3, 600, 680  | 120, 716    | Tongues and sounds ..  | 209, 946      | 9, 179      |
| Haddock.....                     | 1, 952, 349  | 74, 105     | Cod cheeks.....        | 21, 557       | 773         |
| Pollock.....                     | 871, 607     | 26, 323     | Isinglass.....         | 271, 824      | 135, 912    |
| Total.....                       | 24, 680, 404 | 1, 356, 796 | Fish fertilizer.....   | 10, 862, 000  | 103, 513    |
| Smoked:                          |              |             | Fish glue, dry.....    | 1, 926        | 914         |
| Finnan haddie.....               | 207, 164     | 10, 766     | Fish glue, liquid..... | b 2, 294, 865 | 232, 121    |
| Halibut.....                     | 1, 869, 270  | 134, 352    | Fish oil.....          | c 5, 377, 552 | 213, 181    |
| Herring.....                     | 2, 720, 360  | 74, 929     | Total.....             | 19, 176, 774  | 705, 456    |
| Total.....                       | 4, 796, 794  | 220, 047    | Grand total.....       | 103, 015, 401 | 4, 086, 981 |

a Included in these figures are two firms at Rockport, Mass. b Gallons, 235,371. c Gallons, 717,007.

## FISHERIES OF RHODE ISLAND.

The fisheries of Rhode Island in 1898 gave employment to 1,687 persons, of whom 444 were on vessels, 896 in the boat or shore fisheries, and 347 were shoresmen. The investment in vessels, boats, fishing apparatus, shore property, and cash capital amounted to \$957,142. The products aggregated 32,854,396 pounds, valued at \$955,058.

The number of fishing and transporting vessels employed was 93, having a net tonnage of 1,454 tons and a value of \$167,850. The value of their outfits was \$46,597. There were 854 boats in the shore fisheries, valued at \$72,381. The apparatus of capture in the vessel fisheries was valued at \$50,763, and in the shore fisheries at \$99,902. The value of shore and accessory property was \$439,149 and the cash capital amounted to \$80,500.

The products consisted of 20,728,529 pounds of fish, including food species, refuse fish, and menhaden, valued at \$333,789; 457,378 bushels of oysters, valued at \$505,378; 46,227 bushels of clams and quahogs, valued at \$52,385; 19,231 bushels of scallops, valued at \$10,471; 578,066 pounds of lobsters, valued at \$43,290, and a variety of other species and secondary products having a value of \$9,745.

Since 1889, the year covered by the last general canvass, there has been a slight decrease in the number of persons employed and of \$63,036 in the investment. The products have also decreased 94,511,079 pounds in quantity, but have increased \$19,914 in value. There has been a large increase in both the quantity and value of food species, while the menhaden catch has decreased from 112,580,000 pounds, valued at \$281,450, to 3,140,000 pounds, valued at \$7,591.

There has been a tendency toward decline in the menhaden fishery for a number of years. In 1892, for which a special canvass of some of the important species was made, the catch of menhaden had decreased to 34,045,230 pounds, valued at \$115,992. The great falling off in the catch in 1898 is due principally to the fact that in the early part of that year the menhaden industry was consolidated under the control of a company having headquarters in New York City, and most of the vessels which had formerly been engaged in the menhaden fisheries of Rhode Island were transferred to New York and have therefore been credited with their crews and catch to that State. This also accounts for the decrease in the number of persons employed and the amount of capital invested. The fish utilized by the menhaden factories in Rhode Island were practically all supplied by vessels owned by the company above referred to.

The scallop and clam fisheries have both declined as compared with the statistics for the year 1892, the catch of the former in 1898 being 19,231 bushels, valued at \$10,471, and of the latter 15,015 bushels, valued at \$20,569, while in 1892 the yield of scallops was 52,690 bushels and of clams 33,950 bushels. Quahogs were more abundant during 1898

than either scallops or clams, the yield amounting to 31,212 bushels, valued at \$31,816, against 19,950 bushels in 1892. The supply of clams in 1898 was not equal to the local demand, a large proportion of the yield being used for clambakes.

The lobster fishery, as compared with 1892, shows a decrease in products, but an increase in the quantity of apparatus employed. The catch of lobsters in 1892 was 774,100 pounds, valued at \$53,762, and in 1898 it was 578,066 pounds, valued at \$43,290. The number of pots used in the former year was 6,341 and in the latter 10,312. The season for catching lobsters is principally from May to August, inclusive, but more or less fishing is carried on throughout the year. While the law prohibits the capture of lobsters under 9 inches in length, little attention is paid to this provision. The cost of bait used in lobster pots is not very great, as the lobstermen utilize all kinds of fish refuse, which is often obtained from the trap-net fishermen and the local fish markets without cost.

Scup is the most important species, next to oysters, obtained in the fisheries of the State. The catch of scup in 1898 was 6,390,225 pounds, valued at \$75,596, all of which, except 2,300 pounds, worth \$68, taken with hand lines, was secured with trap nets and pound nets. It is said that this fish has been phenomenally abundant every season since 1894. Some years ago about 7,000 barrels of scup were held in a large pound for several months pending a rise in prices. They were fed chiefly on ground menhaden and mussels. It was found that they greatly preferred the menhaden to anything else, the quantity fed to them a day being 100 barrels. When sold they were in good condition, and the experiment proved a success, although a good many of the fish escaped through a break in the pound. They will live, it is said, an entire summer in a pound without being fed, but will become poorer than when first impounded.

Squeteague or weak-fish are also very plentiful, and appear to be getting more so each year. The catch in 1898 amounted to 3,125,635 pounds, valued at \$63,976. At Wickford the sounds, or swim-bladders, are taken from the squeteague, and after being dried are sold as a secondary product. It requires about 35 of these, when prepared for market, to make a pound, the average selling price of which was 30 cents, the total quantity sold being 2,100 pounds, valued at \$630.

Alewives are taken in Point Judith Pond and other waters of the State, but the catch was not so large as in former years. In 1889 the product of fresh, salted, and smoked alewives aggregated 1,046,250 pounds, valued at \$18,138; in 1892 it was 1,189,593 pounds, valued at \$18,216, and in 1898, 838,622 pounds, valued at \$10,273. The trade in salted alewives was very much injured in 1898 by the Spanish-American war, the West Indies being the principal market for this product. Shipments were made by only two persons, and amounted to 368 barrels. In 1899 3,000 barrels were shipped and prices were considerably better.

The fishery for hard and soft shell crabs is carried on by several persons to a limited extent in Narrow River, between Wickford and Narragansett Pier, the season being from about the middle of June to the last of August. Soft crabs were the more valuable, the price received in 1898 being \$1 a dozen, while the hard crabs brought only about 25 cents a dozen. The catch of hard and soft crabs was 12,895 pounds, valued at \$2,250.

The sword-fish fishery, which centers at Block Island, appears to have declined during recent years, owing, it is said, to the scarcity of fish. In former years 15 fish have been caught in a day by one vessel, but a vessel is now considered lucky if she brings in 3 or 4, the chances being that the result of her day's cruise will be only 1 or 2 fish, and possibly none. In 1898 the total catch amounted to 55,875 pounds, valued at \$2,935. Their average weight, dressed, is about 200 pounds. It is said that the largest specimen ever taken by the fishermen of Block Island weighed 618 pounds and was captured about five years ago. The fishery is carried on chiefly by 5 schooners, ranging from 13 to 25 tons net register. The season is from the middle of June to about the 10th of August. In suitable weather the vessels leave the harbor in the morning about 4 o'clock, returning in the afternoon about 5 or 6 o'clock. Before being shipped (and generally before the vessel returns to port) the fish are dressed by removing the head, viscera, and fins, including the caudal, the ventral cavity being washed out with sea water and the carcass wrapped in bagging. Boston and Providence are the principal markets for this product.

The oyster industry is the most important branch of fisheries in the State, its products at the present time having a greater value than all the other fishery products combined. There has been a substantial increase in this industry during the past few years, the yield in 1898 being larger than in any previous year, except 1879, for which data are available. The quantity of market and seed oysters taken from the private and public grounds in 1889 was 203,450 bushels, valued at \$271,939; in 1892 it was 174,446 bushels, valued at \$259,242, and in 1898, 457,378 bushels, valued at \$505,378.

The three tables which follow show the number of persons engaged, the number and value of vessels and boats, the quantity and value of fishing apparatus, the value of shore and accessory property and the amount of cash capital employed, and the quantity and value of the products of the fisheries of Rhode Island in 1898:

*Persons employed.*

| How engaged.                  | No.   |
|-------------------------------|-------|
| On vessels fishing .....      | 365   |
| On vessels transporting ..... | 79    |
| Boat or shore fishermen ..... | 896   |
| Shoresmen .....               | 347   |
| Total .....                   | 1,687 |



Table of apparatus and capital.

| Items.                                     | No.    | Value.     | Items.                                     | No.    | Value.    |
|--|--------|------------|--|--------|-----------|
| Vessels fishing.....                       | 69     | \$121, 600 | Apparatus—shore fisheries:                 |        |           |
| Tonnage.....                               | 894    |            | Pound nets and trap nets.....              | 175    | \$68, 495 |
| Outfit.....                                |        | 43, 441    | Seines.....                                | 42     | 3, 243    |
| Vessels transporting.....                  | 24     | 46, 250    | Gill nets.....                             | 134    | 7, 085    |
| Tonnage.....                               | 560    |            | Fyke nets.....                             | 329    | 2, 462    |
| Outfit.....                                |        | 3, 156     | Lines, hand and trawl.....                 |        | 875       |
| Boats.....                                 | 854    | 72, 381    | Pots, lobster.....                         | 8, 692 | 10, 677   |
| Apparatus—vessel fisheries:                |        |            | Pots, eel.....                             | 2, 942 | 1, 888    |
| Pound nets and trap nets.....              | 27     | 41, 900    | Spears, eel.....                           | 29     | 46        |
| Purse seines.....                          | 7      | 4, 000     | Minor apparatus.....                       |        | 43        |
| Snap nets.....                             | 4      | 20         | Dredges, tongs, diggers, hoes,<br>etc..... |        | 5, 088    |
| Lines, hand and trawl.....                 |        | 1, 135     | Shore and accessory property.....          |        | 439, 149  |
| Pots, lobster.....                         | 1, 620 | 2, 039     | Cash capital.....                          |        | 80, 500   |
| Pots, eel.....                             | 197    | 99         |  |        |           |
| Harpoons.....                              |        | 109        |  |        |           |
| Dredges, tongs, diggers, hoes,<br>etc..... |        | 1, 461     | Total.....                                 |        | 957, 142  |

Table of products.

| Species.                     | Vessel fisheries. |          | Shore fisheries. |          | Total.        |          |
|------------------------------|-------------------|----------|------------------|----------|---------------|----------|
|                              | Lbs.              | Value.   | Lbs.             | Value.   | Lbs.          | Value.   |
| Alewives, fresh.....         | 8, 500            | \$68     | 619, 632         | \$6, 553 | 628, 132      | \$6, 621 |
| Alewives, salted.....        |                   |          | 74, 100          | 940      | 74, 100       | 940      |
| Alewives, smoked.....        |                   |          | 136, 390         | 2, 712   | 136, 390      | 2, 712   |
| Blue-fish.....               | 65, 800           | 3, 280   | 264, 490         | 12, 241  | 330, 290      | 15, 521  |
| Bonito.....                  | 1, 250            | 25       | 123, 200         | 2, 590   | 124, 450      | 2, 615   |
| Bullheads.....               |                   |          | 300              | 24       | 300           | 24       |
| Butter-fish.....             | 89, 200           | 2, 405   | 117, 800         | 3, 210   | 207, 000      | 5, 615   |
| Cod, fresh.....              | 705, 486          | 15, 447  | 406, 325         | 8, 109   | 1, 111, 811   | 23, 556  |
| Cod, salted.....             | 181, 376          | 7, 544   | 133, 725         | 5, 610   | 315, 101      | 13, 154  |
| Cunners.....                 | 3, 300            | 100      |                  |          | 3, 300        | 100      |
| Eels.....                    | 23, 200           | 1, 318   | 420, 174         | 18, 712  | 443, 374      | 20, 030  |
| Flounders and flat-fish..... | 736, 950          | 10, 503  | 973, 107         | 17, 073  | 1, 710, 057   | 27, 576  |
| Haddock.....                 | 316, 800          | 7, 319   | 49, 725          | 1, 054   | 366, 525      | 8, 373   |
| Herring.....                 |                   |          | 2, 000           | 10       | 2, 000        | 10       |
| Hickory shad.....            |                   |          | 13, 000          | 328      | 13, 000       | 328      |
| King-fish.....               | 120               | 18       | 1, 850           | 110      | 1, 970        | 128      |
| Mackerel.....                | 184, 900          | 8, 359   | 175, 000         | 6, 645   | 359, 900      | 15, 004  |
| Menhaden.....                | 3, 100, 000       | 7, 350   | 40, 000          | 241      | 3, 140, 000   | 7, 591   |
| Minnows.....                 |                   |          | 3, 728           | 356      | 3, 728        | 356      |
| Perch.....                   |                   |          | 48, 475          | 1, 920   | 48, 475       | 1, 920   |
| Pickarel.....                |                   |          | 200              | 20       | 200           | 20       |
| Pollock.....                 |                   |          | 50, 000          | 500      | 50, 000       | 500      |
| Scup.....                    | 3, 859, 500       | 39, 635  | 2, 530, 725      | 35, 961  | 6, 390, 225   | 75, 596  |
| Sea bass.....                | 236, 450          | 6, 489   | 204, 500         | 5, 446   | 440, 950      | 11, 935  |
| Shad.....                    | 124               | 8        | 24, 988          | 1, 617   | 25, 112       | 1, 625   |
| Smelt.....                   |                   |          | 4, 100           | 215      | 4, 100        | 215      |
| Spanish mackerel.....        |                   |          | 700              | 104      | 700           | 104      |
| Squeteague.....              | 579, 000          | 11, 290  | 2, 546, 635      | 52, 686  | 3, 125, 635   | 63, 976  |
| Squid.....                   |                   |          | 124, 000         | 1, 375   | 124, 000      | 1, 375   |
| Striped bass.....            | 6, 900            | 533      | 95, 050          | 9, 978   | 101, 950      | 10, 511  |
| Sword-fish.....              | 55, 875           | 2, 935   |                  |          | 55, 875       | 2, 935   |
| Tautog.....                  | 37, 700           | 1, 110   | 210, 429         | 6, 104   | 248, 129      | 7, 214   |
| Tomcod.....                  |                   |          | 8, 000           | 240      | 8, 000        | 240      |
| Miscellaneous fish.....      | 70, 450           | 1, 379   | 175, 300         | 4, 143   | 245, 750      | 5, 522   |
| Refuse fish.....             | 156, 000          | 195      | 856, 000         | 1, 027   | 1, 012, 000   | 1, 222   |
| Shrimp.....                  |                   |          | 2, 250           | 750      | 2, 250        | 750      |
| Lobsters.....                | 92, 333           | 6, 683   | 485, 733         | 36, 607  | 578, 066      | 43, 290  |
| Crabs, hard.....             |                   |          | 7, 875           | 575      | 7, 875        | 575      |
| Crabs, soft.....             |                   |          | 5, 020           | 1, 675   | 5, 020        | 1, 675   |
| Crabs, fiddler.....          |                   |          | 128              | 78       | 128           | 78       |
| Clams.....                   | 9, 060            | 1, 256   | 141, 090         | 19, 313  | a 150, 150    | 20, 569  |
| Quahogs.....                 | 16, 040           | 1, 905   | 233, 656         | 29, 911  | b 249, 696    | 31, 816  |
| Mussels.....                 | 300               | 24       | 15, 250          | 670      | c 15, 550     | 694      |
| Scallops.....                | 11, 520           | 1, 349   | 103, 866         | 9, 122   | d 115, 386    | 10, 471  |
| Oysters, market.....         | 2, 467, 500       | 394, 700 | 624, 596         | 105, 448 | e 3, 092, 096 | 500, 148 |
| Oysters, seed.....           |                   |          | 109, 550         | 5, 230   | f 109, 550    | 5, 230   |
| Oyster shells.....           | 5, 370, 000       | 2, 810   | 2, 304, 000      | 1, 158   | g 7, 674, 000 | 3, 968   |
| Squeteague sounds.....       |                   |          | 2, 100           | 630      | 2, 100        | 630      |
| Total.....                   | 18, 385, 634      | 536, 037 | 14, 468, 762     | 419, 021 | 32, 854, 396  | 955, 058 |

a 15,015 bushels.

c 1,555 bushels.

e 441,728 bushels (season of 1898-99).

g 127,900 bushels.

b 31,212 bushels.

d 19,231 bushels.

f 15,650 bushels.



## THE FISHERIES BY COUNTIES.

The five counties having fishery interests are Newport, Bristol, Providence, Kent, and Washington, the first named taking precedence over all others in the number of persons employed and in the quantity and value of fish proper, although Bristol County ranks first in the total value of products, owing to the large oyster yield, this fishery being conducted chiefly in Bristol, Providence, and Kent counties.

The molluscan fisheries of Newport County are mainly for quahogs, clams, and mussels, most of the quahogs in 1898 being from Coddington Cove, near Newport, where 2,640 bushels were secured, valued at \$3,080. The price received for them was \$1 per bushel in summer and \$1.25 in the winter. Of the clams shown for this county 1,500 bushels were obtained from "Salt Pond," on Block Island.

In the lobster fishery Newport County ranks first and Washington second, the entire lobster catch of the State being taken in these two counties, except 2,500 pounds, valued at \$188, in Bristol County,

Newport County is also prominent in the number of vessels employed and in the trap-net and pound-net fisheries. The number of vessels in its fisheries was 53, valued at \$70,550, and the number of trap nets and pound nets was 111, valued at \$83,550; being over half the number of vessels and of trap nets and pound nets in the State. The catch of trap nets and pound nets in this county aggregated 10,561,019 pounds, valued at \$151,729, or about 73 per cent of the total catch for the State by these apparatus.

Block Island, in Newport County, is the principal center of the line and sword-fish fisheries. The products in 1898 aggregated 2,327,026 pounds, valued at \$64,399, consisting chiefly of cod, haddock, blue-fish, mackerel, and sword-fish in the vessel fisheries, and of squeteague, flat-fish and flounders, bonito, pollock, alewives, sea bass, and scup in the shore fisheries.

In the vessel fisheries there were 8 schooners, of from 13 to 25 tons net register, valued at \$19,100, and 13 smaller vessels, valued at \$8,000; a total of 21 vessels, valued at \$27,100, with 239 net tons.

Besides quite a number of small rowboats, there were in the shore fisheries 25 sailboats, valued at \$7,850. The principal apparatus in the shore fisheries were pound nets, gill nets, lobster pots, and lines.

The vessel fisheries of Block Island have undergone some change during recent years with respect to types of vessels. The old style "pinky" or "Block Island boat" is no longer built, being superseded by the "catboat." Five old pinky boats still remain in the business, but no vessels of this type have been built during the past 18 or 20 years. The "Block Island boat" was especially well adapted for withstanding a heavy sea, being deep and double-ended; they are easily managed and fast sailers, but somewhat lacking in accommodations; 23 of these vessels were employed in the fisheries at Block Island in 1879.

Kent County has smaller fishery interests than any of the others, the most valuable products being oysters, quahogs, and scallops, in the order named. Practically the entire catch of scallops is credited to this county. The catch of Bristol and Providence counties, like that of Kent County, consists chiefly of shellfish.

Washington County ranks second in the yield of products, exclusive of the molluscan fisheries. In this county 76 pound nets, valued at \$25,120, are used. Quite a number of these are set in the salt-water ponds that fringe the coast between Point Judith and Watch Hill. Some of them are of comparatively small value and are used for catching eels and other fish that enter these ponds from the sea.

Table showing the number of persons employed in the fisheries of Rhode Island in 1898.

| Counties.       | On vessels fishing. | On vessels transporting. | Boat or shore fishermen. | Shoresmen. | Total. |
|-----------------|---------------------|--------------------------|--------------------------|------------|--------|
| Newport.....    | 275                 | 21                       | 350                      | 213        | 859    |
| Bristol.....    | 22                  | 13                       | 131                      | 36         | 202    |
| Providence..... | 52                  | 4                        | 86                       | 96         | 238    |
| Kent.....       | 14                  | 9                        | 111                      | 1          | 135    |
| Washington..... | 2                   | 32                       | 218                      | 1          | 253    |
| Total.....      | 365                 | 79                       | 896                      | 347        | 1,687  |

Table showing, by counties, the vessels, boats, apparatus, and capital employed in the fisheries of Rhode Island in 1898.

| Items.                                  | Newport. |          | Bristol. |          | Providence. |          | Kent. |         | Washington. |        |
|---|----------|----------|----------|----------|-------------|----------|-------|---------|-------------|--------|
|   | No.      | Value.   | No.      | Value.   | No.         | Value.   | No.   | Value.  | No.         | Value. |
| Vessels fishing.....                    | 45       | \$61,800 | 4        | \$18,200 | 13          | \$36,350 | 6     | \$4,450 | 1           | \$800  |
| Tonnage.....                            | 544      |          | 73       |          | 210         |          | 60    |         | 7           |        |
| Outfit.....                             |          | 33,287   |          | 1,949    |             | 7,635    |       | 570     |             |        |
| Vessels transporting.....               | 8        | 8,750    | 4        | 16,000   | 2           | 7,000    | 3     | 10,000  | 7           | 4,500  |
| Tonnage.....                            | 81       |          | 174      |          | 62          |          | 171   |         | 72          |        |
| Outfit.....                             |          | 1,650    |          | 672      |             | 190      |       | 125     |             | 519    |
| Boats.....                              | 346      | 31,010   | 122      | 14,385   | 74          | 3,910    | 122   | 13,721  | 190         | 9,355  |
| Apparatus—vessel fisheries:             |          |          |          |          |             |          |       |         |             |        |
| Pound nets and trap nets.....           | 27       | 41,900   |          |          |             |          |       |         |             |        |
| Purse seines.....                       | 7        | 4,000    |          |          |             |          |       |         |             |        |
| Snap nets.....                          | 4        | 20       |          |          |             |          |       |         |             |        |
| Lines, hand and trawl.....              |          | 1,134    |          |          |             |          |       |         |             | 1      |
| Pots, lobster.....                      | 1,600    | 1,999    |          |          |             |          |       |         | 20          | 40     |
| Pots, eel.....                          |          |          |          |          | 100         | 50       | 97    | 49      |             |        |
| Harpoons.....                           |          | 109      |          |          |             |          |       |         |             |        |
| Dredges, tongs, diggers, hoes, etc..... |          |          |          | 230      |             | 939      |       | 292     |             |        |
| Apparatus—shore fisheries:              |          |          |          |          |             |          |       |         |             |        |
| Pound nets and trap nets.....           | 84       | 41,650   | 10       | 1,175    |             |          | 5     | 550     | 76          | 25,120 |
| Seines.....                             |          |          |          |          | 11          | 538      | 4     | 250     | 27          | 2,455  |
| Gill nets.....                          | 57       | 3,725    | 1        | 20       |             |          | 10    | 510     | 66          | 2,830  |
| Fyke nets.....                          | 117      | 602      | 3        | 40       |             |          | 140   | 1,072   | 69          | 748    |
| Lines, hand and trawl.....              |          | 587      |          | 15       |             | 19       |       | 1       |             | 253    |
| Pots, lobsters.....                     | 6,867    | 8,374    | 100      | 100      |             |          |       |         | 1,725       | 2,203  |
| Pots, eel.....                          | 333      | 351      | 237      | 119      | 792         | 396      | 474   | 237     | 1,106       | 785    |
| Spears, eel.....                        | 8        | 8        | 1        | 2        | 10          | 22       | 4     | 6       | 6           | 8      |
| Minor apparatus.....                    |          |          |          |          |             | 27       |       | 7       |             | 9      |
| Dredges, tongs, diggers, hoes, etc..... |          | 261      |          | 1,396    |             | 963      |       | 2,241   |             | 227    |
| Shore and accessory property.....       |          | 356,660  |          | 16,475   |             | 48,700   |       | 4,535   |             | 12,779 |
| Cash capital.....                       |          | 65,000   |          |          |             | 15,500   |       |         |             |        |
| Total.....                              |          | 662,877  |          | 70,778   |             | 122,239  |       | 38,616  |             | 62,632 |

# 370 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the products of the fisheries of Rhode Island in 1898.

| Species.                      | Newport.   |         | Bristol.  |         | Providence. |         | Kent.     |        | Washington. |         |
|-------------------------------|------------|---------|-----------|---------|-------------|---------|-----------|--------|-------------|---------|
|                               | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.        | Value.  | Lbs.      | Val.   | Lbs.        | Value.  |
| Alewives, fresh ....          | 342,000    | \$3,767 | 30,000    | \$430   | 17,000      | \$295   | 1,000     | \$25   | 238,132     | \$2,104 |
| Alewives, salted .....        |            |         | 500       | 20      |             |         |           |        | 73,600      | 920     |
| Alewives, smoked .....        |            |         |           |         |             |         |           |        | 136,390     | 2,712   |
| Blue-fish .....               | 261,400    | 12,733  |           |         |             |         | 25,500    | 840    | 43,390      | 1,948   |
| Bonito .....                  | 124,450    | 2,615   |           |         |             |         |           |        |             |         |
| Bullheads .....               |            |         |           |         |             |         |           |        | 300         | 24      |
| Butter-fish .....             | 165,000    | 4,520   | 6,500     | 248     |             |         |           |        | 35,500      | 847     |
| Cod, fresh .....              | 1,056,486  | 22,432  |           |         |             |         |           |        | 55,325      | 1,124   |
| Cod, salted .....             | 233,876    | 9,644   |           |         |             |         |           |        | 81,225      | 3,510   |
| Cunners .....                 | 3,300      | 100     |           |         |             |         |           |        |             |         |
| Eels .....                    | 42,000     | 1,806   | 50,066    | 1,992   | 178,201     | 10,272  | 43,532    | 2,040  | 129,575     | 3,920   |
| Flounders and flat-fish ..... | 1,232,050  | 18,258  | 65,000    | 1,200   |             |         | 59,554    | 1,037  | 353,453     | 7,081   |
| Haddock .....                 | 336,800    | 7,869   |           |         |             |         |           |        | 29,725      | 504     |
| Herring .....                 | 2,000      | 10      |           |         |             |         |           |        |             |         |
| Hickory shad .....            | 6,000      | 180     |           |         |             |         |           |        | 7,000       | 148     |
| King-fish .....               | 570        | 58      |           |         |             |         |           |        | 1,400       | 70      |
| Mackerel .....                | 251,800    | 11,974  |           |         |             |         |           |        | 108,100     | 3,080   |
| Menhaden .....                | 3,100,000  | 7,350   |           |         | 28,000      | 220     | 12,000    | 21     |             |         |
| Minnows .....                 |            |         |           |         | 3,600       | 340     | 128       | 16     |             |         |
| Perch .....                   |            |         |           |         |             |         |           |        | 48,475      | 1,920   |
| Pickarel .....                |            |         |           |         |             |         |           |        | 200         | 20      |
| Pollock .....                 | 50,000     | 500     |           |         |             |         |           |        |             |         |
| Scup .....                    | 4,802,800  | 52,078  | 1,500     | 40      |             |         |           |        | 1,585,925   | 23,478  |
| Sea bass .....                | 379,100    | 10,384  |           |         |             |         |           |        | 61,850      | 1,551   |
| Shad .....                    | 3,124      | 195     | 12,800    | 800     | 48          | 6       |           |        | 9,140       | 624     |
| Smelt .....                   |            |         |           |         |             |         |           |        | 4,100       | 215     |
| Spanish mackerel .....        | 700        | 104     |           |         |             |         |           |        |             |         |
| Squeteague .....              | 2,148,575  | 44,111  | 159,900   | 3,641   | 1,300       | 62      | 41,875    | 1,592  | 773,985     | 14,570  |
| Squid .....                   | 64,000     | 575     |           |         |             |         |           |        | 60,000      | 800     |
| Striped bass .....            | 36,900     | 2,427   |           |         |             |         |           |        | 65,050      | 8,084   |
| Sword-fish .....              | 55,875     | 2,935   |           |         |             |         |           |        |             |         |
| Tautog .....                  | 161,300    | 4,032   | 17,600    | 680     | 1,000       | 50      | 13,875    | 467    | 54,354      | 1,985   |
| Tomcod .....                  |            |         |           |         |             |         |           |        | 8,000       | 240     |
| Miscellaneous fish .....      | 221,050    | 5,003   |           |         |             |         |           |        | 24,700      | 519     |
| Refuse fish .....             | 748,000    | 958     |           |         |             |         |           |        | 264,000     | 264     |
| Shrimp .....                  |            |         |           |         | 2,010       | 670     | 240       | 80     |             |         |
| Lobsters .....                | 461,033    | 33,991  | 2,500     | 188     |             |         |           |        | 114,533     | 9,111   |
| Crabs, hard .....             |            |         |           |         |             |         |           |        | 7,875       | 575     |
| Crabs, soft .....             |            |         |           |         |             |         |           |        | 5,020       | 1,675   |
| Crabs, fiddler .....          |            |         |           |         | 53          | 40      | 75        | 38     |             |         |
| Clams .....                   | 25,750     | 2,605   | 24,760    | 3,095   | 78,000      | 11,825  | 15,490    | 1,836  | 6,150       | 1,208   |
| Quahogs .....                 | 32,120     | 4,495   | 52,240    | 6,625   | 48,800      | 6,075   | 114,480   | 14,260 | 2,056       | 361     |
| Mussels .....                 | 10,000     | 350     | 1,500     | 30      | 750         | 50      | 3,300     | 264    |             |         |
| Scallops .....                |            |         | 1,650     | 247     | 3,600       | 300     | 110,136   | 9,924  |             |         |
| Oysters, market .....         |            |         | 1,932,336 | 310,686 | 969,500     | 151,775 | 164,500   | 33,300 | 25,760      | 4,387   |
| Oysters, seed .....           |            |         | 86,450    | 4,315   | 19,600      | 715     | 3,500     | 200    |             |         |
| Oyster shells .....           |            |         | 4,236,000 | 2,143   | 3,000,000   | 1,600   | 402,000   | 219    | 36,000      | 6       |
| Squeteague sounds .....       |            |         |           |         |             |         |           |        | 2,100       | 630     |
| Total .....                   | 16,358,059 | 268,059 | 6,681,302 | 336,380 | 4,351,462   | 184,295 | 1,011,185 | 66,159 | 4,452,388   | 100,165 |

## THE VESSEL AND SHORE FISHERIES.

The number of vessels fishing was 69, valued at \$121,600; their net tonnage being 894 tons and the value of their outfits \$43,441. The number engaged in transporting, comprised almost wholly of sail vessels, was 24, valued at \$46,250, their net tonnage being 560 tons and the value of their outfits \$3,156.

The vessels included 20 steamers, 14 of which were engaged in the oyster and 6 in the trap-net fisheries. A number of vessels employed in the fisheries of this State during a part of the year have been credited to other States where they were owned and used in the fisheries. The products of the vessel fisheries aggregated 18,385,634 pounds, valued at \$536,037, the more important species being oysters, scup, cod, squeteague, flat-fish and flounders, mackerel, menhaden, haddock,

lobsters, and sea bass. The yield of the shore fisheries was 14,468,762 pounds, valued at \$419,021, the principal species, in the order of their importance, being oysters, squeteague, lobsters, scup, quahogs, clams, eels, flat-fish and flounders, blue-fish, striped bass, cod, scallops, alewives, mackerel, and tautog.

The most valuable and effective forms of apparatus employed for the capture of fish proper in the vessel and shore fisheries were trap nets and pound nets. In the vessel fisheries 27 trap nets were operated, having a value of \$41,900. The value of all other forms of apparatus used by the vessels, including purse seines, snap nets, lines, pots, harpoons, dredges, tongs, etc., was \$8,863. In the shore fisheries there were 175 trap nets and pound nets used, valued at \$68,495; all other apparatus, consisting of seines, gill nets, fyke nets, lines, pots, spears, dredges, tongs, etc., being valued at \$31,407.

Some of the ocean trap nets have a weight, including the leader but exclusive of anchors, of about 3,000 pounds. The construction of one of these trap nets requires about 2,000 pounds of rope, varying from 2-inch to the large cable size, and costing 7 cents a pound, and 8,000 corks or floats worth \$3 a hundred. About eighteen anchors, weighing from 200 to 700 pounds each, are also necessary for setting one of these nets. The names "trap" and "pound" are often used interchangeably by the fishermen, but the former relates more properly to the floating trap net held in place by anchors, and the latter to the pound net set with stakes.

The trap-net fishery centering at Sakonnet Point and in the vicinity of Newport is of considerable importance. In addition to the small boats ordinarily used in the fishery, there were nine steamboats (some of them not owned in the State) engaged in tending the nets and transporting the fish. Three steamboats not owned in the State were employed in the pound-net fishery between Point Judith and Watch Hill, in Washington County. The trap nets, with perhaps a few exceptions, were set in deep water.

The season for fishing trap nets and pound nets extends from the latter part of April to about the 15th of July, the best fishing being from May 1 to June 15. There is also more or less pound-net fishing carried on in different parts of the State in the summer and fall, but the catch is not so large as it is in the spring. The spring fishing is often called "scup fishing," on account of the predominance of that species in May and the early part of June. A large deep-water trap net is capable of holding thousands of barrels of fish at one time; but the scup were so abundant in 1898 that some of the nets were closed at times to allow them to pass by. When the fish are so plentiful prices are very low and shipments can not be made with profit. The products secured with trap nets and pound nets in 1898 aggregated 14,385,126 pounds, valued at \$220,791. Of this quantity 6,387,925 pounds, valued at \$75,528, were scup, and 7,997,201 pounds, valued at \$145,263,

consisted of flat-fish and flounders, squeteague, sea bass, butter-fish, and various other species.

The most important group of apparatus employed in the fisheries of the State, as determined by the value of the catch, was comprised of dredges, tongs, clam diggers, and hoes. The products obtained with these consisted of oysters and oyster shells, clams, quahogs, and scallops, and were valued at \$572,896. A considerable quantity of products was also taken with other forms of apparatus. The yield of seines amounted to 3,630,143 pounds, valued at \$21,978, the more important species being mackerel, menhaden, and alewives. Gill nets secured 330,770 pounds, valued at \$11,828, consisting principally of blue-fish and squeteague. The catch of fyke nets was 141,645 pounds, valued at \$3,385, the greater part of which was flat-fish. The hand and trawl line catch was 1,972,116 pounds, valued at \$60,076, the more abundant species being cod, haddock, mackerel, tautog, and blue-fish. The catch with lobster and eel pots consisted of 578,066 pounds of lobsters, valued at \$43,290, and 291,225 pounds of eels, valued at \$13,271. In the vessel fisheries harpoons were used for the capture of sword-fish, the catch being 55,875 pounds, valued at \$2,935. The remainder of the products was taken with spears, snap nets, and minor apparatus, and was valued at \$4,608.

The following series of tables shows by counties, species, and apparatus the quantity and value of products obtained in the vessel and shore fisheries of Rhode Island in 1898:

*Table showing, by counties, the yield of the seine fisheries of Rhode Island in 1898.*

| Species.                     | Newport.  |         | Providence. |       | Kent.  |       | Washington. |       | Total.    |         |
|------------------------------|-----------|---------|-------------|-------|--------|-------|-------------|-------|-----------|---------|
|                              | Lbs.      | Val.    | Lbs.        | Val.  | Lbs.   | Val.  | Lbs.        | Val.  | Lbs.      | Value.  |
| Vessel fisheries:            |           |         |             |       |        |       |             |       |           |         |
| Mackerel .....               | 80,000    | \$2,843 | .....       | ..... | .....  | ..... | .....       | ..... | 80,000    | \$2,843 |
| Menhaden .....               | 3,100,000 | 7,350   | .....       | ..... | .....  | ..... | .....       | ..... | 3,100,000 | 7,350   |
| Total .....                  | 3,180,000 | 10,193  | .....       | ..... | .....  | ..... | .....       | ..... | 3,180,000 | 10,193  |
| Shore fisheries:             |           |         |             |       |        |       |             |       |           |         |
| Alewives, fresh .....        |           |         | 2,000       | \$70  | 1,000  | \$25  | 83,232      | \$408 | 86,232    | 508     |
| Alewives, salted .....       |           |         |             |       |        |       | 73,600      | 920   | 73,600    | 920     |
| Alewives, smoked .....       |           |         |             |       |        |       | 93,790      | 1,860 | 93,790    | 1,860   |
| Blue-fish .....              |           |         |             |       | 5,000  | 200   |             |       | 5,000     | 200     |
| Bullheads .....              |           |         |             |       |        |       | 300         | 24    | 300       | 24      |
| Cod .....                    |           |         |             |       |        |       | 1,500       | 45    | 1,500     | 45      |
| Eels .....                   |           |         | 36,533      | 2,172 |        |       | 2,700       | 135   | 39,233    | 2,307   |
| Flounders .....              |           |         |             |       |        |       | 19,375      | 748   | 19,375    | 748     |
| Mackerel .....               |           |         |             |       |        |       | 3,300       | 120   | 3,300     | 120     |
| Menhaden .....               |           |         | 28,000      | 220   | 12,000 | 21    |             |       | 40,000    | 241     |
| Minnows .....                |           |         | 3,000       | 260   | 128    | 16    |             |       | 3,128     | 276     |
| Perch .....                  |           |         |             |       |        |       | 47,475      | 1,801 | 47,475    | 1,801   |
| Pickarel .....               |           |         |             |       |        |       | 200         | 20    | 200       | 20      |
| Smelt .....                  |           |         |             |       |        |       | 1,100       | 110   | 1,100     | 110     |
| Squeteague .....             |           |         | 1,000       | 50    | 17,250 | 510   |             |       | 18,250    | 560     |
| Striped bass .....           |           |         |             |       |        |       | 11,500      | 1,298 | 11,500    | 1,298   |
| Tautog .....                 |           |         |             |       | 4,375  | 157   |             |       | 4,375     | 157     |
| Shrimp .....                 |           |         | 1,785       | 595   |        |       |             |       | 1,785     | 595     |
| Total .....                  |           |         | 72,318      | 3,367 | 39,753 | 929   | 338,072     | 7,489 | 450,143   | 11,785  |
| Total vessel and shore ..... | 3,180,000 | 10,193  | 72,318      | 3,367 | 39,753 | 929   | 338,072     | 7,489 | 3,630,143 | 21,978  |



Table showing, by counties, the yield of the gill-net fisheries of Rhode Island in 1898.

| Species.                | Newport.       |              | Bristol.   |           | Kent.         |            | Washington.    |              | Total.         |               |
|-------------------------|----------------|--------------|------------|-----------|---------------|------------|----------------|--------------|----------------|---------------|
|                         | Lbs.           | Val.         | Lbs.       | Val.      | Lbs.          | Val.       | Lbs.           | Val.         | Lbs.           | Value.        |
| <b>Shore fisheries:</b> |                |              |            |           |               |            |                |              |                |               |
| Blue-fish .....         | 119,600        | \$5,653      |            |           | 20,500        | \$640      | 32,890         | \$1,368      | 172,990        | \$7,661       |
| Bonito .....            | 1,000          | 20           |            |           |               |            |                |              | 1,000          | 20            |
| Spanish mackerel .....  | 400            | 80           |            |           |               |            |                |              | 400            | 80            |
| Squeteague .....        | 82,400         | 2,332        | 400        | \$16      | 3,750         | 82         | 69,830         | 1,637        | 156,380        | 4,067         |
| <b>Total .....</b>      | <b>203,400</b> | <b>8,085</b> | <b>400</b> | <b>16</b> | <b>24,250</b> | <b>722</b> | <b>102,720</b> | <b>3,005</b> | <b>330,770</b> | <b>11,828</b> |

Table showing the yield of the pound-net and trap-net fisheries of Rhode Island in 1898.

| Species.                      | Newport.          |                | Bristol.       |              | Kent.         |              | Washington.      |               | Total.            |                |
|-------------------------------|-------------------|----------------|----------------|--------------|---------------|--------------|------------------|---------------|-------------------|----------------|
|                               | Lbs.              | Val.           | Lbs.           | Val.         | Lbs.          | Val.         | Lbs.             | Val.          | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>      |                   |                |                |              |               |              |                  |               |                   |                |
| Alewives .....                | 8,500             | \$68           |                |              |               |              |                  |               | 8,500             | \$68           |
| Blue-fish .....               | 8,600             | 420            |                |              |               |              |                  |               | 8,600             | 420            |
| Bonito .....                  | 1,250             | 25             |                |              |               |              |                  |               | 1,250             | 25             |
| Butter-fish .....             | 89,200            | 2,405          |                |              |               |              |                  |               | 89,200            | 2,405          |
| Cod .....                     | 218,000           | 3,620          |                |              |               |              |                  |               | 218,000           | 3,620          |
| Flounders and flat-fish ..... | 709,000           | 10,060         |                |              |               |              |                  |               | 709,000           | 10,060         |
| King-fish .....               | 120               | 18             |                |              |               |              |                  |               | 120               | 18             |
| Mackerel .....                | 13,600            | 1,020          |                |              |               |              |                  |               | 13,600            | 1,020          |
| Scup .....                    | 3,859,500         | 39,635         |                |              |               |              |                  |               | 3,859,500         | 39,635         |
| Sea bass .....                | 218,800           | 5,575          |                |              |               |              |                  |               | 218,800           | 5,575          |
| Shad .....                    | 124               | 8              |                |              |               |              |                  |               | 124               | 8              |
| Squeteague .....              | 579,000           | 11,290         |                |              |               |              |                  |               | 579,000           | 11,290         |
| Striped bass .....            | 6,900             | 533            |                |              |               |              |                  |               | 6,900             | 533            |
| Tautog .....                  | 10,500            | 253            |                |              |               |              |                  |               | 10,500            | 253            |
| Miscellaneous fish .....      | 70,450            | 1,379          |                |              |               |              |                  |               | 70,450            | 1,379          |
| Refuse fish .....             | 156,000           | 195            |                |              |               |              |                  |               | 156,000           | 195            |
| <b>Total .....</b>            | <b>5,949,544</b>  | <b>76,504</b>  |                |              |               |              |                  |               | <b>5,949,544</b>  | <b>76,504</b>  |
| <b>Shore fisheries:</b>       |                   |                |                |              |               |              |                  |               |                   |                |
| Alewives, fresh .....         | 333,500           | 3,699          | 30,000         | \$430        |               |              | 154,900          | \$1,696       | 518,400           | 5,825          |
| Alewives, salted .....        |                   |                | 500            | 20           |               |              |                  |               | 500               | 20             |
| Alewives, smoked .....        |                   |                |                |              |               |              | 42,600           | 852           | 42,600            | 852            |
| Blue-fish .....               | 47,000            | 2,350          |                |              |               |              | 8,000            | 455           | 55,000            | 2,805          |
| Bonito .....                  | 122,200           | 2,570          |                |              |               |              |                  |               | 122,200           | 2,570          |
| Butter-fish .....             | 75,800            | 2,115          | 6,500          | 248          |               |              | 35,500           | 847           | 117,800           | 3,210          |
| Cod, fresh .....              | 16,000            | 450            |                |              |               |              | 24,600           | 458           | 40,600            | 908            |
| Cod, salted .....             |                   |                |                |              |               |              | 5,000            | 230           | 5,000             | 230            |
| Eels .....                    | 8,000             | 400            | 800            | 24           | 1,333         | \$50         | 56,150           | 1,496         | 66,283            | 1,970          |
| Flounders and flat-fish ..... | 465,300           | 6,918          | 55,000         | 1,000        | 8,334         | 250          | 278,900          | 4,425         | 807,534           | 12,598         |
| Haddock .....                 |                   |                |                |              |               |              | 9,000            | 90            | 9,000             | 90             |
| Herring .....                 | 2,000             | 10             |                |              |               |              |                  |               | 2,000             | 10             |
| Hickory shad .....            | 6,000             | 180            |                |              |               |              | 7,000            | 148           | 13,000            | 328            |
| King-fish .....               | 450               | 40             |                |              |               |              | 1,400            | 70            | 1,850             | 110            |
| Mackerel .....                | 21,000            | 1,035          |                |              |               |              | 99,000           | 2,380         | 120,000           | 3,415          |
| Perch .....                   |                   |                |                |              |               |              | 1,000            | 119           | 1,000             | 119            |
| Pollock .....                 | 50,000            | 500            |                |              |               |              |                  |               | 50,000            | 500            |
| Scup .....                    | 943,300           | 12,443         | 500            | 10           |               |              | 1,584,625        | 23,440        | 2,528,425         | 35,893         |
| Sea bass .....                | 137,650           | 3,745          |                |              |               |              | 60,300           | 1,453         | 197,950           | 5,198          |
| Shad .....                    | 3,000             | 187            | 12,800         | 800          |               |              | 9,140            | 624           | 24,940            | 1,611          |
| Smelt .....                   |                   |                |                |              |               |              | 3,000            | 105           | 3,000             | 105            |
| Spanish mackerel .....        | 300               | 24             |                |              |               |              |                  |               | 300               | 24             |
| Squeteague .....              | 1,470,375         | 29,985         | 159,500        | 3,625        | 20,875        | 1,000        | 700,850          | 12,776        | 2,351,600         | 47,386         |
| Squid .....                   | 64,000            | 575            |                |              |               |              | 60,000           | 800           | 124,000           | 1,375          |
| Striped bass .....            | 30,000            | 1,894          |                |              |               |              | 53,550           | 6,786         | 83,550            | 8,680          |
| Tautog .....                  | 73,000            | 1,718          | 6,600          | 240          | 8,300         | 250          | 27,750           | 452           | 115,650           | 2,660          |
| Miscellaneous fish .....      | 150,600           | 3,624          |                |              |               |              | 24,700           | 519           | 175,300           | 4,143          |
| Refuse fish .....             | 592,000           | 763            |                |              |               |              | 264,000          | 264           | 856,000           | 1,027          |
| Squeteague sounds .....       |                   |                |                |              |               |              | 2,100            | 630           | 2,100             | 630            |
| <b>Total .....</b>            | <b>4,611,475</b>  | <b>75,225</b>  | <b>272,200</b> | <b>6,397</b> | <b>38,842</b> | <b>1,550</b> | <b>3,513,065</b> | <b>61,115</b> | <b>8,435,582</b>  | <b>144,287</b> |
| <b>Vessel and shore .....</b> | <b>10,561,019</b> | <b>151,729</b> | <b>272,200</b> | <b>6,397</b> | <b>38,842</b> | <b>1,550</b> | <b>3,513,065</b> | <b>61,115</b> | <b>14,385,126</b> | <b>220,791</b> |

Table showing, by counties, the yield of the fyke-net fisheries of Rhode Island in 1898.

| Species.                | Newport.      |            | Bristol.      |            | Kent.         |            | Washington.   |              | Total.         |              |
|-------------------------|---------------|------------|---------------|------------|---------------|------------|---------------|--------------|----------------|--------------|
|                         | Lbs.          | Value.     | Lbs.          | Value.     | Lbs.          | Value.     | Lbs.          | Value.       | Lbs.           | Value.       |
| <b>Shore fisheries:</b> |               |            |               |            |               |            |               |              |                |              |
| Eels .....              |               |            | 3,000         | \$120      |               |            |               |              | 3,000          | \$120        |
| Flat-fish .....         | 27,500        | \$835      | 10,000        | 200        | 51,220        | \$787      | 41,925        | \$1,203      | 130,645        | 3,025        |
| Tomcod .....            |               |            |               |            |               |            | 8,000         | 240          | 8,000          | 240          |
| <b>Total .....</b>      | <b>27,500</b> | <b>835</b> | <b>13,000</b> | <b>320</b> | <b>51,220</b> | <b>787</b> | <b>49,925</b> | <b>1,443</b> | <b>141,645</b> | <b>3,385</b> |



# 374 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the yield of the hand and trawl line fisheries of Rhode Island in 1898.

| Species.         | Bristol. |        | Providence. |        | Kent. |        |
|------------------|----------|--------|-------------|--------|-------|--------|
|                  | Lbs.     | Value. | Lbs.        | Value. | Lbs.  | Value. |
| Shore fisheries: |          |        |             |        |       |        |
| Eels.....        | 6,400    | \$288  | 6,667       | \$360  |       |        |
| Scup.....        | 1,000    | 30     |             |        |       |        |
| Squeteague.....  |          |        | 300         | 12     |       |        |
| Tautog.....      | 11,000   | 440    | 1,000       | 50     | 1,200 | \$60   |
| Total.....       | 18,400   | 758    | 7,967       | 422    | 1,200 | 60     |

| Species.                     | Newport.  |         | Washington. |        | Total.    |         |
|------------------------------|-----------|---------|-------------|--------|-----------|---------|
|                              | Lbs.      | Value.  | Lbs.        | Value. | Lbs.      | Value.  |
| Vessel fisheries:            |           |         |             |        |           |         |
| Blue-fish.....               | 57,200    | \$2,860 |             |        | 57,200    | \$2,860 |
| Cod, fresh.....              | 487,486   | 11,827  |             |        | 487,486   | 11,827  |
| Cod, salted.....             | 181,376   | 7,544   |             |        | 181,376   | 7,544   |
| Flounders.....               | 27,250    | 415     | 700         | \$28   | 27,950    | 443     |
| Haddock.....                 | 316,800   | 7,319   |             |        | 316,800   | 7,319   |
| Mackerel.....                | 91,300    | 4,496   |             |        | 91,300    | 4,496   |
| Sea bass.....                | 17,650    | 914     |             |        | 17,650    | 914     |
| Tautog.....                  | 26,800    | 837     | 400         | 20     | 27,200    | 857     |
| Total.....                   | 1,205,862 | 36,212  | 1,100       | 48     | 1,206,962 | 36,260  |
| Shore fisheries:             |           |         |             |        |           |         |
| Blue-fish.....               | 29,000    | 1,450   | 2,500       | 125    | 31,500    | 1,575   |
| Cod, fresh.....              | 335,000   | 6,535   | 29,225      | 621    | 364,225   | 7,156   |
| Cod, salted.....             | 52,500    | 2,100   | 76,225      | 3,280  | 128,725   | 5,380   |
| Eels.....                    |           |         |             |        | 13,067    | 648     |
| Flounders and flat-fish..... | 3,000     | 30      | 12,553      | 677    | 15,553    | 707     |
| Haddock.....                 | 20,000    | 550     | 20,725      | 414    | 40,725    | 964     |
| Mackerel.....                | 45,900    | 2,580   | 5,800       | 530    | 51,700    | 3,110   |
| Scup.....                    |           |         | 1,300       | 38     | 2,300     | 68      |
| Sea bass.....                | 5,000     | 150     | 1,550       | 98     | 6,550     | 248     |
| Squeteague.....              | 16,800    | 504     | 3,305       | 157    | 20,405    | 673     |
| Tautog.....                  | 51,000    | 1,224   | 26,204      | 1,513  | 90,404    | 3,287   |
| Total.....                   | 558,200   | 15,123  | 179,387     | 7,453  | 765,154   | 23,816  |
| Total vessel and shore.....  | 1,764,062 | 51,335  | 180,487     | 7,501  | 1,972,116 | 60,076  |

Table showing, by counties, the catch of eels and lobsters by pots in Rhode Island in 1898.

| Species.                    | Newport. |         | Bristol. |         | Washington. |        |
|-----------------------------|----------|---------|----------|---------|-------------|--------|
|                             | Lbs.     | Value.  | Lbs.     | Value.  | Lbs.        | Value. |
| Vessel fisheries:           |          |         |          |         |             |        |
| Lobsters.....               | 90,333   | \$6,523 |          |         | 2,000       | \$160  |
| Shore fisheries:            |          |         |          |         |             |        |
| Eels.....                   | 28,700   | 1,116   | 39,200   | \$1,520 | 70,125      | 2,265  |
| Lobsters.....               | 370,700  | 27,468  | 2,500    | 188     | 112,533     | 8,951  |
| Total.....                  | 399,400  | 28,584  | 41,700   | 1,708   | 182,658     | 11,216 |
| Total vessel and shore..... | 489,733  | 35,107  | 41,700   | 1,708   | 184,658     | 11,376 |

| Species.                    | Providence. |        | Kent.  |        | Total.  |         |
|-----------------------------|-------------|--------|--------|--------|---------|---------|
|                             | Lbs.        | Value. | Lbs.   | Value. | Lbs.    | Value.  |
| Vessel fisheries:           |             |        |        |        |         |         |
| Eels.....                   | 13,334      | \$800  | 9,866  | \$518  | 23,200  | \$1,318 |
| Lobsters.....               |             |        |        |        | 92,833  | 6,683   |
| Total.....                  | 13,334      | 800    | 9,866  | 518    | 115,533 | 8,001   |
| Shore fisheries:            |             |        |        |        |         |         |
| Eels.....                   | 103,000     | 5,820  | 27,000 | 1,232  | 268,025 | 11,953  |
| Lobsters.....               |             |        |        |        | 485,733 | 36,607  |
| Total.....                  | 103,000     | 5,820  | 27,000 | 1,232  | 753,758 | 48,560  |
| Total vessel and shore..... | 116,334     | 6,620  | 36,866 | 1,750  | 869,291 | 56,561  |

Table showing, by counties, the catch by dredges, tongs, etc., in Rhode Island in 1898.

| Species.                            | Newport.      |              | Bristol.         |                | Providence.      |                |
|-------------------------------------|---------------|--------------|------------------|----------------|------------------|----------------|
|                                     | Lbs.          | Value.       | Lbs.             | Value.         | Lbs.             | Value.         |
| <b>Vessel fisheries:</b>            |               |              |                  |                |                  |                |
| Clams .....                         |               |              |                  |                | 5,000            | \$750          |
| Quahogs .....                       |               |              | 400              | \$50           | 10,400           | 1,200          |
| Scallops .....                      |               |              |                  |                | 600              | 50             |
| Oysters, market .....               |               |              | 1,491,000        | 241,000        | 934,600          | 146,050        |
| Oyster shells .....                 |               |              | 2,370,000        | 1,210          | 3,000,000        | 1,600          |
| <b>Total.....</b>                   |               |              | <b>3,861,400</b> | <b>242,260</b> | <b>3,950,500</b> | <b>149,650</b> |
| <b>Shore fisheries:</b>             |               |              |                  |                |                  |                |
| Clams .....                         | 25,750        | \$2,605      | 24,760           | 3,095          | 73,000           | 11,075         |
| Quahogs .....                       | 32,120        | 4,495        | 51,840           | 6,575          | 38,400           | 4,875          |
| Mussels .....                       | 10,000        | 350          | 1,500            | 30             | 750              | 50             |
| Scallops .....                      |               |              | 1,650            | 247            | 3,000            | 250            |
| Oysters, market .....               |               |              | 441,336          | 69,686         | 35,000           | 5,725          |
| Oysters, seed .....                 |               |              | 86,450           | 4,315          | 19,600           | 715            |
| Oyster shells .....                 |               |              | 1,866,000        | 933            |                  |                |
| <b>Total.....</b>                   | <b>67,870</b> | <b>7,450</b> | <b>2,473,536</b> | <b>84,881</b>  | <b>169,750</b>   | <b>22,690</b>  |
| <b>Total vessel and shore .....</b> | <b>67,870</b> | <b>7,450</b> | <b>6,334,936</b> | <b>327,141</b> | <b>4,120,250</b> | <b>172,340</b> |

| Species.                            | Kent.          |               | Washington.   |              | Total.            |                |
|-------------------------------------|----------------|---------------|---------------|--------------|-------------------|----------------|
|                                     | Lbs.           | Value.        | Lbs.          | Value.       | Lbs.              | Value.         |
| <b>Vessel fisheries:</b>            |                |               |               |              |                   |                |
| Clams .....                         | 4,060          | \$506         |               |              | 9,060             | \$1,256        |
| Quahogs .....                       | 5,240          | 655           |               |              | 16,040            | 1,905          |
| Mussels .....                       | 300            | 24            |               |              | 300               | 24             |
| Scallops .....                      | 10,920         | 1,299         |               |              | 11,520            | 1,349          |
| Oysters, market .....               | 42,000         | 7,650         |               |              | 2,467,500         | 394,700        |
| Oysters, shell .....                |                |               |               |              | 5,370,000         | 2,810          |
| <b>Total.....</b>                   | <b>62,520</b>  | <b>10,134</b> |               |              | <b>7,874,420</b>  | <b>402,044</b> |
| <b>Shore fisheries:</b>             |                |               |               |              |                   |                |
| Clams .....                         | 11,430         | 1,330         | 6,150         | \$1,208      | 141,090           | 19,313         |
| Quahogs .....                       | 109,240        | 13,605        | 2,056         | 361          | 233,656           | 29,911         |
| Mussels .....                       | 3,000          | 240           |               |              | 15,250            | 670            |
| Scallops .....                      | 99,216         | 8,625         |               |              | 103,866           | 9,122          |
| Oysters, market .....               | 122,500        | 25,650        | 25,760        | 4,387        | 624,596           | 105,448        |
| Oysters, seed .....                 | 3,500          | 200           |               |              | 109,550           | 5,230          |
| Oysters shells .....                | 402,000        | 219           | 36,000        | 6            | 2,304,000         | 1,158          |
| <b>Total.....</b>                   | <b>750,886</b> | <b>49,869</b> | <b>69,966</b> | <b>5,962</b> | <b>3,532,008</b>  | <b>170,852</b> |
| <b>Total vessel and shore .....</b> | <b>813,406</b> | <b>60,003</b> | <b>69,966</b> | <b>5,962</b> | <b>11,406,428</b> | <b>572,896</b> |

Table showing, by counties, the catch of eels by spears in Rhode Island in 1898.

| Counties.         | Lbs.          | Value.       |
|-------------------|---------------|--------------|
| Newport .....     | 5,300         | \$290        |
| Bristol .....     | 666           | 40           |
| Providence .....  | 18,667        | 1,120        |
| Kent .....        | 5,333         | 240          |
| Washington .....  | 600           | 24           |
| <b>Total.....</b> | <b>30,566</b> | <b>1,714</b> |

Table showing the catch by harpoons and snap nets in Rhode Island in 1898.

| Apparatus.               | County.       | Species.         | Lbs.   | Value.  |
|--------------------------|---------------|------------------|--------|---------|
| <b>Vessel fisheries:</b> |               |                  |        |         |
| Harpoons .....           | Newport ..... | Sword-fish ..... | 55,875 | \$2,935 |
| Snap nets .....          | do .....      | Cunners .....    | 3,300  | 100     |

*Table showing the catch by minor apparatus in the fisheries of Rhode Island in 1898.*

| Species.            | Providence. |        | Kent. |        | Washington. |        | Total. |        |
|---------------------|-------------|--------|-------|--------|-------------|--------|--------|--------|
|                     | Lbs.        | Value. | Lbs.  | Value. | Lbs.        | Value. | Lbs.   | Value. |
| Shore fisheries:    |             |        |       |        |             |        |        |        |
| Alewives.....       | 15,000      | \$225  |       |        |             |        | 15,000 | \$225  |
| Minnows.....        | 600         | 80     |       |        |             |        | 600    | 80     |
| Shad.....           | 48          | 6      |       |        |             |        | 48     | 6      |
| Shrimp.....         | 225         | 75     | 240   | \$80   |             |        | 465    | 155    |
| Crabs, hard.....    |             |        |       |        | 7,875       | \$575  | 7,875  | 575    |
| Crabs, soft.....    |             |        |       |        | 5,020       | 1,675  | 5,020  | 1,675  |
| Crabs, fiddler..... | 53          | 40     | 75    | 38     |             |        | 128    | 78     |
| Total.....          | 15,926      | 426    | 315   | 118    | 12,895      | 2,250  | 29,136 | 2,794  |

## THE OYSTER INDUSTRY.

The private cultivation of oysters is carried on under the general supervision of the State, represented by a shellfish commission, from which leases of oyster-grounds are secured. The rental depends upon the depth of water. For a depth of 12 feet and over at mean low tide it is \$5 an acre; under 12 feet, \$10 an acre. In determining the depth of water a Government chart is used and the acreage is measured by the State surveyor. The revenue accruing to the State from this source during the year 1898 amounted to \$7,690.07, and it was estimated that the receipts for the following year would be \$20,000 or more. Leases are not granted to persons outside of the State, but a large percentage of the total acreage is planted and controlled by oyster planters living in other States, who obtain leases through the medium of their foremen or other residents. In 1898 the total area held by lessees was 1,922.3 acres, most of which rented for \$10 an acre.

The total yield of the private beds was 439,148 bushels of marketable oysters, valued at \$497,360, and of the public oyster-grounds 2,580 bushels, valued at \$2,788, while 15,650 bushels of native seed were obtained and planted, the value of which was \$5,230. In 1892 the total area under cultivation was 700 acres. The yield of marketable oysters from the cultivated areas was about 157,581 bushels, valued at \$251,384, and from the public grounds it was approximately 2,000 bushels, valued at \$2,075. There were also 14,865 bushels of native seed oysters used for planting purposes, having a value of \$5,783.

In the upper waters of Narragansett Bay considerable difficulty is sometimes experienced by the planters in connection with the greening of the oysters. A good deal of the ground formerly occupied in this section has therefore been abandoned, the disposition being to take up land farther down the bay. A considerable area has recently been leased in Mount Hope Bay, most of which rents for \$5 an acre, and large plants were made there in 1899.

In addition to the stock already on the beds, there were planted by the cultivators in 1898 420,200 bushels of seed oysters, valued at \$268,730 when delivered. The bulk of this supply was from Connecticut waters, sailing vessels being chiefly used as transporters. At one

time seed oysters from Virginia were cultivated by the planters of Narragansett Bay, but the climate has been found to be too severe for the southern product.

The seed supply of 1898 was from the following sources:

| States.            | Bushels. | Value.    |
|--------------------|----------|-----------|
| Connecticut.....   | 393,050  | \$257,175 |
| Massachusetts..... | *11,500  | 6,325     |
| Native.....        | 15,650   | 5,230     |
| Total.....         | 420,200  | 268,730   |

\*Including a few seed from Greenport, N. Y.

The price for Connecticut seed ranged from 50 cents to 95 cents a bushel, according to age, but the usual cost was 65 cents, including freight, which was generally 5 cents a bushel. Native seed brought from 25 to 40 cents a bushel. Some of these were picked up by hand at low tide along the shores. The Seakonk River is one of the chief sources of native seed supply. These oysters, as well as the seed from Somerset, Mass., are green when first taken from the water, and are only used for planting purposes, but the green color disappears in a short time after they have been transplanted. Some of the oyster-planters from Connecticut raise their own seed oysters and transplant them to the Rhode Island beds in the spring.

Quite a number of oyster-planters sold shells during 1898, which were used on roads, in gas works, and for planting purposes, the total quantity sold by them being 127,900 bushels, worth \$3,968. Others did not sell any shells, having need for them on their own beds, and one cultivator found it necessary to buy 80,000 bushels.

Starfish do not appear to be so destructive as formerly, owing to the systematic and persistent manner in which they are destroyed by the oyster-planters, tangles being used for catching them. It would seem that isolated beds suffer most from this enemy. Of 1,200 bushels of seed planted in 1897 at Wickford only 300 bushels of marketable oysters were secured, the remainder being destroyed by starfish. In 1898 27,362 bushels of starfish were caught by the oyster-growers of Narragansett Bay, chiefly by those of Bristol and Providence counties.

The mussel is another source of annoyance to the oyster-planter. The usual method of destroying them is by exposing the oysters to the sun until the mussels which are attached to them die and fall off. The oysters are then returned to the water. This process is effective, but is supposed to be more or less injurious to the oysters. If the mussels are not removed, the oysters become poor and are also very troublesome to open.

The following table shows the extent of the oyster industry of Rhode Island in 1898.

*Table showing the extent of the oyster industry of Rhode Island in 1898.*

| Items.                             | No.   | Value.   | Items.   | No.      | Value.      |
|------------------------------------|-------|----------|--|----------|-------------|
| Persons engaged .....              | * 312 |          | Shore and accessory property .....                       |          | \$41,800.00 |
| Vessels fishing (steam) .....      | 13    | \$54,900 | Oyster ground held by lessees (acres) .....              | 1,922.3  |             |
| Tonnage .....                      | 276   |          | Amount of rental paid .....                              |          | 7,690.07    |
| Outfit .....                       |       | 9,789    | Oysters, market, from planted grounds (bushels) .....    | †439,148 | 497,360.00  |
| Vessels fishing (sail) .....       | 1     | 800      | Oysters, market, from natural grounds (bushels) .....    | †2,580   | 2,788.00    |
| Tonnage .....                      | 11    |          | Oysters, native seed planted (bushels) .....             | 15,650   | 5,230.00    |
| Vessels transporting (steam) ..... | 1     | 4,000    | Oysters, seed from other States, planted (bushels) ..... | 404,550  | 263,500.00  |
| Tonnage .....                      | 13    |          | Oyster shells sold (bushels) .....                       | 127,900  | 3,968.00    |
| Outfit .....                       |       | 350      | Starfish caught and destroyed (bushels) .....            | 27,362   |             |
| Vessels transporting (sail) .....  | 8     | 29,000   |  |          |             |
| Tonnage .....                      | 394   |          |  |          |             |
| Outfit .....                       |       | 637      |  |          |             |
| Boats .....                        | 111   | 13,836   |  |          |             |
| Apparatus on vessels:              |       |          |  |          |             |
| Tongs .....                        | 46    | 279      |  |          |             |
| Dredges .....                      | 35    | 910      |  |          |             |
| Apparatus on boats:                |       |          |  |          |             |
| Tongs .....                        | 154   | 798      |  |          |             |
| Dredges .....                      | 61    | 759      |  |          |             |

\* On vessels fishing, 69; on vessels transporting, 26; on boats, 107; on shore, 110.

† Oyster season of 1898-99.

## THE MENHADEN INDUSTRY.

In 1898 there were two menhaden factories in Rhode Island, one of which was in operation only six weeks. 106,838 barrels of menhaden, equivalent to about 35,612,667 fish, were handled at these factories, and the resulting products were 306,960 gallons of oil, valued at \$61,407, and 3,576 tons of scrap, valued at \$34,982. The largest catches of menhaden are made in June, July, August, and September. The yield of oil varies from  $\frac{1}{2}$  to 4 gallons for each barrel of fish, according to their condition, which depends somewhat on where they are obtained and the time of the season in which they are caught.

The following table shows the important features of the menhaden industry in Rhode Island for 1898:

*Table showing the extent of the menhaden industry of Rhode Island in 1898.*

| Items.                                  | Number.    | Value.    |
|---|------------|-----------|
| Factories .....                         | 2          | \$328,000 |
| Cash capital .....                      |            | 60,000    |
| Wages paid .....                        |            | 27,630    |
| Persons employed .....                  | 206        |           |
| Menhaden pressed .....                  | 35,612,667 | 53,419    |
| Tons of acidulated scrap prepared ..... | 3,576      | 34,982    |
| Gallons of oil made .....               | 306,960    | 61,407    |

## THE WHOLESALE FISHERY TRADE.

The wholesale trade was conducted by three firms in Providence and one in Newport, the principal products being fresh fish and lobsters. The greater part of the lobsters were handled at Newport. The value of the four establishments was \$28,025. The amount of cash capital was \$20,500, while \$13,180 were paid out in wages, the number of employees being 28. The value of the products as sold amounted to nearly \$200,000.

*Table showing the extent of the wholesale fishery trade of Rhode Island in 1898.*

| Items.                | No.       | Value.   |
|-----------------------|-----------|----------|
| Establishments .....  | 4         | \$28,025 |
| Cash capital .....    |           | 20,500   |
| Wages paid .....      |           | 13,180   |
| Persons engaged ..... | 28        |          |
| Products:             |           |          |
| Fresh fish .....      | 3,850,000 | 97,125   |
| Smoked haddock .....  | 6,000     | 420      |
| Sword-fish .....      | 116,400   | 11,640   |
| Lobsters .....        | 689,375   | 71,906   |
| Clams .....           | 720       | 900      |
| Quahogs .....         | 3,900     | 4,825    |
| Scallops .....        | 4,800     | 5,250    |
| Oysters .....         | 2,440     | 3,500    |

## FISHERIES OF CONNECTICUT.

In 1898 there were 2,473 persons employed in the fishery industries of Connecticut. The investment in vessels, apparatus, etc., amounted to \$1,241,291, and the products amounted to 31,920,417 pounds, for which the fishermen received \$1,559,599.

Compared with 1889, the fisheries were fairly prosperous, and comparatively few changes of importance occurred. A decrease appears in the number of the fishermen, due principally to the use of better equipment both in vessels and apparatus of capture. The value of the capital invested, as shown by the returns, decreased from \$2,826,834 in 1889 to \$1,241,291 in 1898. This is not due so much to a decrease in the investment as to a change in the manner of reporting it. In the former year the value of the oyster-grounds was included with the item of shore property, whereas in 1898 it was omitted entirely. If that item be excluded from the returns for each year, the decrease in the investment appears to be only \$282,818 instead of \$1,585,543, as in the tables. The total value of the product shows a fractional increase over that of 1889, when it was \$1,557,506, whereas in 1898 it was \$1,559,599.

The two principal items in the products, as in 1889, were oysters and lobsters, the yield of the former being valued at \$1,249,071, or 80 per cent of the total, and of the latter \$83,748, or 5 per cent of the total. In 1889 the oyster yield was valued at \$1,055,807 and the lobster product at \$83,099. The yield of menhaden and cod, which were respectively third and fourth in rank in 1889, have decreased in value, the former from \$100,569 to \$26,334 and the latter from \$50,018 to \$10,978 in the two years under comparison. The yield of blue-fish, flounders, sea bass, squeteague, hard clams, and soft clams shows little change in value, but the fisheries for halibut and red snappers are no longer prosecuted by vessels from this State.

The three tables which follow show the number of persons employed, the amount of capital invested, and the quantity and value of products secured in the fisheries of Connecticut in 1898.



*Persons employed.*

| How engaged.                    | No.   |
|---------------------------------|-------|
| On vessels fishing.....         | 779   |
| On vessels transporting.....    | 17    |
| In shore or boat fisheries..... | 1,080 |
| Shoresmen.....                  | 647   |
| Total.....                      | 2,473 |

*Table of apparatus and capital.*

| Items.                      | No.   | Value.    | Items.                            | No.   | Value.    |
|-----------------------------|-------|-----------|-----------------------------------|-------|-----------|
| Vessels fishing.....        | 187   | \$428,950 | Apparatus—shore fisheries:        |       |           |
| Tonnage.....                | 3,438 |           | Seines.....                       | 63    | \$4,855   |
| Outfit.....                 |       | 130,542   | Gill nets.....                    | 89    | 5,025     |
| Vessels transporting.....   | 8     | 5,700     | Pound nets.....                   | 66    | 19,930    |
| Tonnage.....                | 117   |           | Fyke nets.....                    | 410   | 3,522     |
| Outfit.....                 |       | 718       | Eel pots and spears.....          | 1,369 | 1,234     |
| Boats.....                  | 1,214 | 80,915    | Lobster pots.....                 | 6,250 | 10,266    |
| Apparatus—vessel fisheries: |       |           | Lines.....                        |       | 124       |
| Seines.....                 | 4     | 1,500     | Dredges.....                      | 250   | 2,010     |
| Lobster pots.....           | 4,580 | 7,139     | Tongs, rakes, and hoes.....       | 767   | 4,498     |
| Lines.....                  |       | 1,233     | Minor apparatus.....              |       | 700       |
| Harpoons.....               |       | 177       | Shore and accessory property..... |       | 344,380   |
| Dredges.....                | 536   | 8,623     | Cash capital.....                 |       | 179,250   |
|                             |       |           | Total.....                        |       | 1,241,291 |

*Table of products.*

| Species.                  | Vessel fisheries. |           | Shore fisheries. |         | Total.       |           |
|---------------------------|-------------------|-----------|------------------|---------|--------------|-----------|
|                           | Lbs.              | Value.    | Lbs.             | Value.  | Lbs.         | Value.    |
| Alewives.....             |                   |           | 868,400          | \$7,346 | 868,400      | \$7,346   |
| Blue-fish.....            | 891,035           | \$29,147  | 72,250           | 3,704   | 963,285      | 32,851    |
| Bullheads.....            |                   |           | 3,032            | 114     | 3,032        | 114       |
| Butter-fish.....          |                   |           | 60,280           | 2,370   | 60,280       | 2,370     |
| Carp.....                 |                   |           | 910              | 46      | 910          | 46        |
| Cod.....                  | 445,980           | 10,764    | 5,245            | 214     | 451,225      | 10,978    |
| Eels.....                 |                   |           | 206,970          | 14,149  | 206,970      | 14,149    |
| Flounders.....            | 26,250            | 973       | 417,614          | 12,410  | 443,864      | 13,388    |
| Haddock.....              | 112,800           | 856       |                  |         | 112,800      | 856       |
| Mackerel, fresh.....      | 7,850             | 573       | 33,063           | 1,180   | 40,913       | 1,753     |
| Mackerel, salted.....     | 28,000            | 2,000     |                  |         | 28,000       | 2,000     |
| Menhaden.....             | 6,428,010         | 16,947    | 4,754,900        | 9,387   | 11,182,910   | 26,334    |
| Perch, white.....         |                   |           | 13,822           | 671     | 13,822       | 671       |
| Perch, yellow.....        |                   |           | 1,750            | 89      | 1,750        | 89        |
| Pickarel.....             |                   |           | 5,420            | 271     | 5,420        | 271       |
| Scup.....                 | 5,020             | 216       | 96,020           | 3,288   | 101,040      | 3,504     |
| Sea bass.....             | 217,019           | 10,554    | 30,770           | 1,628   | 247,789      | 12,182    |
| Shad.....                 |                   |           | 499,325          | 21,215  | 499,325      | 21,215    |
| Smelt.....                |                   |           | 5,600            | 837     | 5,600        | 837       |
| Spanish mackerel.....     |                   |           | 66               | 12      | 66           | 12        |
| Squeteague.....           | 500               | 15        | 193,143          | 5,436   | 193,643      | 5,451     |
| Striped bass.....         |                   |           | 13,845           | 1,662   | 13,845       | 1,662     |
| Sturgeon.....             |                   |           | 700              | 33      | 700          | 33        |
| Suckers.....              |                   |           | 53,373           | 2,068   | 53,373       | 2,068     |
| Sword-fish.....           | 85,980            | 7,520     |                  |         | 85,980       | 7,520     |
| Tautog.....               | 15,500            | 620       | 55,040           | 2,498   | 70,540       | 3,118     |
| Tomcod or frost-fish..... |                   |           | 38,750           | 1,677   | 38,750       | 1,677     |
| Whiting.....              |                   |           | 3,850            | 185     | 3,850        | 185       |
| Squid.....                |                   |           | 6,900            | 150     | 6,900        | 150       |
| Lobsters.....             | 421,627           | 30,282    | 676,565          | 53,466  | 1,098,192    | 83,748    |
| Oysters.....              | 13,277,663        | 1,140,953 | 1,355,620        | 108,118 | a 14,633,283 | 1,249,071 |
| Clams, hard.....          |                   |           | 234,000          | 29,900  | b 234,000    | 29,900    |
| Clams, soft.....          |                   |           | 199,800          | 19,039  | c 199,800    | 19,039    |
| Scallops.....             |                   |           | 50,160           | 5,016   | d 50,160     | 5,016     |
| Total.....                | 21,963,234        | 1,251,420 | 9,957,183        | 308,179 | 31,920,417   | 1,559,599 |

a 2,090,469 bushels.

b 29,250 bushels.

c 19,980 bushels.

d 8,360 bushels.

## THE FISHERIES BY COUNTIES.

Five counties in Connecticut have commercial fisheries, viz, Fairfield, New Haven, Middlesex, New London, and Hartford. All of these except Middlesex border Long Island Sound, and Middlesex, Hartford, and New London border the Connecticut River. The following tables indicate the extent to which each of these was interested in the fishing industries in 1898. New Haven and Fairfield counties, with their important oyster industries, rank first and second, respectively, in the items of persons employed, investment, and value of products, but of fish proper New London yields far more than all other counties combined:

*Table showing, by counties, the number of persons employed in the fisheries of Connecticut in 1898.*

| Counties.       | On vessels fishing. | On vessels transporting. | In shore or boat fisheries. | Shoresmen. | Total. |
|-----------------|---------------------|--------------------------|-----------------------------|------------|--------|
| Fairfield.....  | 360                 | 3                        | 291                         | 68         | 722    |
| New Haven.....  | 180                 | 6                        | 222                         | 557        | 965    |
| Middlesex.....  |                     |                          | 208                         |            | 208    |
| Hartford.....   |                     |                          | 89                          |            | 89     |
| New London..... | 239                 | 8                        | 220                         | 22         | 489    |
| Total.....      | 779                 | 17                       | 1,030                       | 647        | 2,473  |

*Table showing, by counties, the vessels, boats, apparatus, and capital employed in the fisheries of Connecticut in 1898.*

| Items.                            | Fairfield. |           | New Haven. |           | Middlesex. |         | Hartford. |         | New London. |          |
|-----------------------------------|------------|-----------|------------|-----------|------------|---------|-----------|---------|-------------|----------|
|                                   | No.        | Value.    | No.        | Value.    | No.        | Value.  | No.       | Value.  | No.         | Value.   |
| Vessels fishing.....              | 103        | \$207,570 | 28         | \$149,025 | .....      | .....   | .....     | .....   | 56          | \$72,355 |
| Tonnage.....                      | 1,491      |           | 1,025      |           | .....      | .....   | .....     | .....   | 922         |          |
| Outfit.....                       |            | 49,975    |            | 54,425    | .....      | .....   | .....     | .....   |             | 26,142   |
| Vessels transporting.....         | 1          | 800       | 3          | 2,050     | .....      | .....   | .....     | .....   | 4           | 2,850    |
| Tonnage.....                      | 16         |           | 40         |           | .....      | .....   | .....     | .....   | 61          |          |
| Outfit.....                       |            | 50        |            | 180       | .....      | .....   | .....     | .....   |             | 488      |
| Boats.....                        | 429        | 28,020    | 295        | 15,005    | 207        | \$9,112 | 47        | \$1,050 | 236         | 27,728   |
| Apparatus—vessel fisheries:       |            |           |            |           |            |         |           |         |             |          |
| Seines.....                       |            |           | 1          | 500       | .....      | .....   | .....     | .....   | 3           | 1,000    |
| Lobster pots.....                 | 105        | 200       | .....      | .....     | .....      | .....   | .....     | .....   | 4,475       | 6,939    |
| Lines.....                        |            |           | .....      | .....     | .....      | .....   | .....     | .....   |             | 1,233    |
| Harpoons.....                     |            |           | .....      | .....     | .....      | .....   | .....     | .....   |             | 177      |
| Dredges.....                      | 428        | 5,937     | 108        | 2,686     | .....      | .....   | .....     | .....   |             |          |
| Apparatus—shore fisheries:        |            |           |            |           |            |         |           |         |             |          |
| Seines.....                       | 13         | 765       | 1          | 40        | 18         | 990     | 30        | 2,990   | 1           | 70       |
| Gill nets.....                    | 2          | 110       | .....      | .....     | 54         | 3,200   | 14        | 380     | 19          | 1,335    |
| Pound nets.....                   |            |           | 16         | 8,680     | 6          | 2,990   | .....     | .....   | 44          | 8,260    |
| Fyke nets.....                    | 13         | 385       | 14         | 133       | 17         | 207     | 5         | 60      | 361         | 2,737    |
| Eel pots and spears.....          | 318        | 449       | 433        | 391       | 182        | 103     | .....     | .....   | 436         | 291      |
| Lobster pots.....                 | 345        | 755       | 950        | 1,644     | 736        | 1,204   | .....     | .....   | 4,219       | 6,663    |
| Lines.....                        |            | 32        |            | 10        | .....      | 52      | .....     | .....   |             | 30       |
| Dredges.....                      | 217        | 1,715     | 33         | 295       | .....      | .....   | .....     | .....   |             |          |
| Tongs, rakes, and hoes.....       | 400        | 3,016     | 250        | 1,041     | 85         | 327     | .....     | .....   | 32          | 114      |
| Minor apparatus.....              |            | 700       | .....      | .....     | .....      | .....   | .....     | .....   |             |          |
| Shore and accessory property..... |            | 110,150   |            | 217,250   | .....      | 1,625   | .....     | 655     |             | 14,700   |
| Cash capital.....                 |            | 20,000    |            | 151,250   | .....      | .....   | .....     | .....   |             | 8,000    |
| Total.....                        |            | 430,629   |            | 604,605   |            | 19,810  |           | 5,135   |             | 181,112  |

*Table showing, by counties, the products of the fisheries of Connecticut in 1898.*

| Species.                  | Fairfield. |         | New Haven. |         | Middlesex. |         | Hartford. |         | New London. |         |
|---------------------------|------------|---------|------------|---------|------------|---------|-----------|---------|-------------|---------|
|                           | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.      | Value.  | Lbs.        | Value.  |
| Alewives.....             |            |         | 12,300     | \$161   | 227,455    | \$2,193 | 583,945   | \$4,690 | 44,700      | \$302   |
| Blue-fish.....            | 4,000      | \$300   | 1,750      | 87      | 61,300     | 3,055   |           |         | 896,235     | 29,409  |
| Bullheads.....            |            |         |            |         | 610        | 27      | 1,422     | 57      | 1,000       | 30      |
| Butter-fish.....          |            |         | 6,910      | 202     | 2,000      | 68      |           |         | 51,370      | 2,100   |
| Carp.....                 |            |         |            |         | 530        | 27      | 380       | 19      |             |         |
| Cod.....                  | 4,000      | 160     | 445        | 16      | 620        | 31      |           |         | 446,160     | 10,771  |
| Eels.....                 | 53,100     | 4,615   | 33,800     | 2,682   | 46,520     | 2,501   | 100       | 7       | 73,450      | 4,344   |
| Flounders.....            | 5,900      | 299     | 46,850     | 1,596   | 12,150     | 406     |           |         | 378,964     | 11,082  |
| Haddock.....              |            |         |            |         |            |         |           |         | 112,800     | 856     |
| Mackerel, fresh.....      |            |         | 100        | 10      |            |         |           |         | 40,813      | 1,743   |
| Mackerel, salted.....     |            |         |            |         |            |         |           |         | 28,000      | 2,000   |
| Menhaden.....             |            |         | 5,983,410  | 12,159  | 510,000    | 1,110   |           |         | 4,689,500   | 13,065  |
| Perch, white.....         |            |         |            |         | 3,135      | 157     | 7,964     | 398     | 2,723       | 116     |
| Perch, yellow.....        |            |         |            |         | 1,750      | 89      |           |         |             |         |
| Pickarel.....             |            |         |            |         | 1,500      | 80      | 1,230     | 65      | 2,690       | 126     |
| Scup.....                 |            |         |            |         |            |         |           |         | 101,040     | 3,504   |
| Sea bass.....             | 300        | 30      | 1,100      | 58      | 1,800      | 108     |           |         | 244,589     | 11,986  |
| Shad.....                 |            |         | 4,784      | 349     | 304,037    | 12,707  | 67,568    | 2,902   | 122,986     | 5,257   |
| Smelt.....                | 5,500      | 825     | 100        | 12      |            |         |           |         |             |         |
| Spanish mackerel.....     |            |         | 30         | 6       |            |         |           |         | 36          | 6       |
| Squeteague.....           | 10,250     | 618     | 36,700     | 929     | 10,600     | 287     |           |         | 136,093     | 3,617   |
| Striped bass.....         | 4,700      | 672     | 2,950      | 332     | 4,200      | 425     | 180       | 24      | 1,815       | 209     |
| Sturgeon.....             |            |         | 500        | 25      |            |         |           |         | 200         | 8       |
| Suckers.....              |            |         |            |         | 23,250     | 920     | 19,503    | 777     | 10,620      | 371     |
| Sword-fish.....           |            |         |            |         |            |         |           |         | 85,980      | 7,520   |
| Tautog.....               | 11,800     | 944     | 5,600      | 289     | 2,250      | 112     |           |         | 50,890      | 1,773   |
| Tomcod or frost-fish..... | 36,250     | 1,585   | 1,300      | 52      |            |         |           |         | 1,200       | 40      |
| Whiting.....              |            |         |            |         |            |         |           |         | 3,850       | 185     |
| Squid.....                |            |         |            |         |            |         |           |         | 6,900       | 150     |
| Lobsters.....             | 45,260     | 4,741   | 36,120     | 4,253   | 31,980     | 3,804   |           |         | 984,832     | 70,950  |
| Oysters.....              | 4,902,142  | 456,334 | 9,606,541  | 783,037 | 89,600     | 4,850   |           |         | 35,000      | 4,850   |
| Clams, hard.....          | 204,800    | 25,865  | 27,200     | 3,785   | 2,000      | 250     |           |         |             |         |
| Clams, soft.....          | 44,300     | 5,224   | 138,500    | 11,870  | 14,500     | 1,695   |           |         | 2,500       | 250     |
| Scallops.....             | 50,160     | 5,016   |            |         |            |         |           |         |             |         |
| Total.....                | 5,382,462  | 507,228 | 15,946,990 | 821,910 | 1,351,787  | 34,902  | 682,292   | 8,939   | 8,556,886   | 186,620 |

## THE PRODUCTS BY APPARATUS OF CAPTURE.

As regards the value of the products, the principal forms of apparatus employed in the fisheries of Connecticut are those used in the molluscan fisheries, viz, dredges, tongs, etc. The yield of these in 1898 amounted to \$1,303,026, or 83 per cent of the total value. The items entering into this value are oysters, \$1,249,071; hard clams, \$29,900; soft clams, \$19,039, and scallops, \$5,016. Pots and spears rank next in importance in this particular, with a yield valued at \$98,000, consisting of \$83,748 worth of lobsters, \$14,004 of eels, and \$248 of flounders.

Of the forms of apparatus employed in the capture of fish proper, lines yielded the largest value, viz, \$60,574, comprised principally of blue-fish, sea bass, and cod, the catch of each being valued at \$32,087, \$12,152, and \$10,924, respectively. The value of other species taken by lines was \$5,411, of which \$2,164 represented the value of tautog or black-fish. The seine fishery was second in importance, yielding 7,437,144 pounds, valued at \$33,855. Menhaden was the most important item in this product, with a yield of 6,428,010 pounds, worth \$16,947. Alewives and shad ranked next, with a return of 810,300 and 94,120 pounds, worth \$6,891 and \$4,064, respectively.

The pound-net fishery, which is prosecuted only in New Haven, Middlesex, and New London counties, yielded 5,486,670 pounds of fish, for which the fishermen received \$32,374—a decrease from 1889,

when the product was 7,556,665 pounds, worth \$43,288. The principal items in the returns for 1898 were menhaden, 4,706,900 pounds, worth \$9,287; flounders, 277,654 pounds, worth \$7,843; squeteague, 179,893 pounds, worth \$4,728; scup, 96,020 pounds, worth \$3,288; and butterfish, 60,280 pounds, worth \$2,370.

The gill-net fishery yielded 401,511 pounds of fish in 1898, valued at \$17,074, of which 375,561 pounds, worth \$15,680, represented the shad yield. The remaining species taken by means of gill nets were blue-fish, squeteague, striped bass, and alewives.

Although fyke nets are used in every county in the State in which fisheries are prosecuted, the fishery is of comparatively little importance, the total yield amounting to only 213,083 pounds, worth \$6,096. The principal item in this total was flounders, the yield of which amounted to 131,760 pounds, worth \$4,206.

The following series of eight tables shows, by counties and species, the quantity and value of products taken with each form of apparatus in the vessel and shore fisheries of Connecticut in 1898:

*Table showing, by counties, the yield of the seine fisheries of Connecticut in 1898.*

| Species.                  | Fairfield.    |              | Middlesex.     |              | Hartford.      |              |
|---------------------------|---------------|--------------|----------------|--------------|----------------|--------------|
|                           | Lbs.          | Value.       | Lbs.           | Value.       | Lbs.           | Value.       |
| <b>Shore fisheries:</b>   |               |              |                |              |                |              |
| Alewives.....             |               |              | 205,855        | \$1,881      | 583,645        | \$4,685      |
| Blue-fish.....            | 300           | \$30         |                |              |                |              |
| Bullheads.....            |               |              | 390            | 18           | 1,422          | 57           |
| Carp.....                 |               |              | 480            | 24           | 380            | 19           |
| Eels.....                 |               |              | 300            | 18           | 100            | 7            |
| Perch, white.....         |               |              | 2,535          | 127          | 7,464          | 373          |
| Perch, yellow.....        |               |              | 150            | 9            |                |              |
| Pickrel.....              |               |              | 1,100          | 60           | 1,230          | 65           |
| Shad.....                 |               |              | 35,856         | 1,517        | 57,624         | 2,479        |
| Smelt.....                | 5,500         | 825          |                |              |                |              |
| Squeteague.....           | 3,600         | 182          |                |              |                |              |
| Striped bass.....         | 1,100         | 132          | 80             | 10           | 180            | 24           |
| Suckers.....              |               |              | 17,150         | 688          | 16,503         | 657          |
| Tomcod or frost-fish..... | 10,750        | 430          |                |              |                |              |
| <b>Total.....</b>         | <b>21,250</b> | <b>1,599</b> | <b>263,896</b> | <b>4,352</b> | <b>668,548</b> | <b>8,366</b> |

| Species.                           | New Haven.       |              | New London.      |               | Total.           |               |
|------------------------------------|------------------|--------------|------------------|---------------|------------------|---------------|
|                                    | Lbs.             | Value.       | Lbs.             | Value.        | Lbs.             | Value.        |
| <b>Vessel fisheries:</b>           |                  |              |                  |               |                  |               |
| Mackerel, salted.....              |                  |              | 28,000           | \$2,000       | 28,000           | \$2,000       |
| Menhaden.....                      | 1,753,410        | \$4,091      | 4,674,600        | 12,856        | 6,428,010        | 16,947        |
| Scup.....                          |                  |              | 800              | 24            | 800              | 24            |
| <b>Total.....</b>                  | <b>1,753,410</b> | <b>4,091</b> | <b>4,703,400</b> | <b>14,880</b> | <b>6,456,810</b> | <b>18,971</b> |
| <b>Shore fisheries:</b>            |                  |              |                  |               |                  |               |
| Alewives.....                      | 12,000           | 155          | 8,800            | 170           | 810,300          | 6,891         |
| Blue-fish.....                     |                  |              |                  |               | 300              | 30            |
| Bullheads.....                     |                  |              | 1,000            | 30            | 2,812            | 105           |
| Carp.....                          |                  |              |                  |               | 860              | 43            |
| Eels.....                          |                  |              |                  |               | 400              | 25            |
| Perch, white.....                  |                  |              | 1,000            | 40            | 10,999           | 540           |
| Perch, yellow.....                 |                  |              |                  |               | 150              | 9             |
| Pickrel.....                       |                  |              | 800              | 32            | 3,130            | 157           |
| Shad.....                          | 640              | 68           |                  |               | 94,120           | 4,064         |
| Smelt.....                         |                  |              |                  |               | 5,500            | 825           |
| Squeteague.....                    |                  |              |                  |               | 3,600            | 182           |
| Striped bass.....                  |                  |              |                  |               | 1,360            | 166           |
| Suckers.....                       |                  |              | 2,400            | 72            | 36,053           | 1,417         |
| Tomcod or frost-fish.....          |                  |              |                  |               | 10,750           | 430           |
| <b>Total.....</b>                  | <b>12,640</b>    | <b>223</b>   | <b>14,000</b>    | <b>344</b>    | <b>980,334</b>   | <b>14,884</b> |
| <b>Total vessel and shore.....</b> | <b>1,766,050</b> | <b>4,314</b> | <b>4,717,400</b> | <b>15,224</b> | <b>7,437,144</b> | <b>33,855</b> |

# 384 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

Table showing, by counties, the yield of the gill-net fisheries of Connecticut in 1898.

| Species.          | Fairfield. |        | Middlesex. |        | Hartford. |        | New London. |         | Total.  |        |
|-------------------|------------|--------|------------|--------|-----------|--------|-------------|---------|---------|--------|
|                   | Lbs.       | Value. | Lbs.       | Value. | Lbs.      | Value. | Lbs.        | Value.  | Lbs.    | Value. |
| Shore fisheries:  |            |        |            |        |           |        |             |         |         |        |
| Alewives.....     |            |        | 4,000      | \$48   |           |        |             |         | 4,000   | \$48   |
| Blue-fish.....    | 700        | \$70   | 10,600     | 530    |           |        |             |         | 11,300  | 600    |
| Shad.....         |            |        | 243,021    | 10,027 | 9,944     | \$423  | 122,596     | \$5,230 | 375,561 | 15,680 |
| Squeteague.....   | 3,650      | 256    | 3,000      | 90     |           |        |             |         | 6,650   | 346    |
| Striped bass..... |            |        | 4,000      | 400    |           |        |             |         | 4,000   | 400    |
| Total.....        | 4,350      | 326    | 264,621    | 11,095 | 9,944     | 423    | 122,596     | 5,230   | 401,511 | 17,074 |

Table showing, by counties, the yield of the pound-net fisheries of Connecticut in 1898.

| Species.                | New Haven. |        | Middlesex. |        | New London. |        | Total.    |        |
|-------------------------|------------|--------|------------|--------|-------------|--------|-----------|--------|
|                         | Lbs.       | Value. | Lbs.       | Value. | Lbs.        | Value. | Lbs.      | Value. |
| Shore fisheries:        |            |        |            |        |             |        |           |        |
| Alewives.....           | 300        | \$6    | 17,600     | \$264  | 35,900      | \$132  | 53,800    | \$402  |
| Blue-fish.....          | 1,750      | 87     |            |        | 900         | 47     | 2,650     | 134    |
| Butter-fish.....        | 6,910      | 202    | 2,000      | 68     | 51,370      | 2,100  | 60,280    | 2,370  |
| Cod.....                | 445        | 16     | 620        | 31     | 180         | 7      | 1,245     | 54     |
| Eels.....               | 450        | 36     |            |        | 1,030       | 66     | 1,480     | 102    |
| Flounders.....          | 41,850     | 1,434  | 10,950     | 358    | 224,854     | 6,051  | 277,654   | 7,843  |
| Mackerel.....           | 100        | 10     |            |        | 31,963      | 1,050  | 32,063    | 1,060  |
| Menhaden.....           | 4,182,000  | 7,968  | 510,000    | 1,110  | 14,900      | 209    | 4,706,900 | 9,287  |
| Scup.....               |            |        |            |        | 96,020      | 3,288  | 96,020    | 3,288  |
| Sea bass.....           | 100        | 8      |            |        | 370         | 22     | 470       | 30     |
| Shad.....               | 4,144      | 281    | 25,160     | 1,163  | 340         | 27     | 29,644    | 1,471  |
| Smelt.....              | 100        | 12     |            |        |             |        | 100       | 12     |
| Squeteague.....         | 36,700     | 929    | 7,600      | 197    | 135,593     | 3,602  | 179,893   | 4,728  |
| Spanish mackerel.....   | 30         | 6      |            |        | 36          | 6      | 66        | 12     |
| Striped bass.....       | 600        | 67     |            |        | 1,815       | 209    | 2,415     | 276    |
| Sturgeon.....           | 500        | 25     |            |        | 200         | 8      | 700       | 33     |
| Tautog.....             | 3,100      | 164    | 1,050      | 52     | 25,090      | 669    | 29,240    | 885    |
| Tomcod or frost-fish .. | 1,300      | 52     |            |        |             |        | 1,300     | 52     |
| Whiting.....            |            |        |            |        | 3,850       | 185    | 3,850     | 185    |
| Squid.....              |            |        |            |        | 6,900       | 150    | 6,900     | 150    |
| Total.....              | 4,280,379  | 11,303 | 574,980    | 3,243  | 631,311     | 17,828 | 5,486,670 | 32,374 |

Table showing, by counties, the yield of the fyke-net fisheries of Connecticut in 1898.

| Species.                | Fairfield. |      | New Haven. |       | Middlesex. |      | Hartford. |      | New London. |       | Total.  |       |
|-------------------------|------------|------|------------|-------|------------|------|-----------|------|-------------|-------|---------|-------|
|                         | Lbs.       | Val. | Lbs.       | Val.  | Lbs.       | Val. | Lbs.      | Val. | Lbs.        | Val.  | Lbs.    | Val.  |
| Shore fisheries:        |            |      |            |       |            |      |           |      |             |       |         |       |
| Alewives.....           |            |      |            |       | 220        | \$9  | 300       | \$5  |             |       | 300     | \$5   |
| Bullheads.....          |            |      |            |       | 50         | 3    |           |      |             |       | 220     | 9     |
| Carp.....               |            |      |            |       |            |      |           |      |             |       | 50      | 3     |
| Eels.....               |            |      |            |       |            |      |           |      | 350         | \$18  | 350     | 18    |
| Flounders.....          | 900        | \$54 | 5,000      | \$162 |            |      |           |      | 125,860     | 3,990 | 131,760 | 4,206 |
| Menhaden.....           |            |      | 48,000     | 100   |            |      |           |      |             |       | 48,000  | 100   |
| Perch, white.....       |            |      |            |       | 600        | 30   | 500       | 25   | 1,723       | 76    | 2,823   | 131   |
| Perch, yellow.....      |            |      |            |       | 1,600      | 80   |           |      |             |       | 1,600   | 80    |
| Pickrel.....            |            |      |            |       | 400        | 20   |           |      | 1,890       | 94    | 2,290   | 114   |
| Striped bass....        | 3,600      | 540  | 650        | 65    | 120        | 15   |           |      |             |       | 4,370   | 620   |
| Suckers.....            |            |      |            |       | 6,100      | 232  | 3,000     | 120  | 8,220       | 299   | 17,320  | 651   |
| Tautog.....             |            |      |            |       |            |      |           |      | 1,800       | 69    | 1,800   | 69    |
| Tomcod or frost-fish .. | 1,000      | 50   |            |       |            |      |           |      | 1,200       | 40    | 2,200   | 90    |
| Total.....              | 5,500      | 644  | 53,650     | 327   | 9,090      | 389  | 3,800     | 150  | 141,043     | 4,586 | 213,083 | 6,096 |

Table showing, by counties, the yield of the line fisheries of Connecticut in 1898.

| Species.                        | Fairfield. |        | New Haven. |        | Middlesex. |         | New London. |          | Total.    |          |
|---------------------------------|------------|--------|------------|--------|------------|---------|-------------|----------|-----------|----------|
|                                 | Lbs.       | Value. | Lbs.       | Value. | Lbs.       | Value.  | Lbs.        | Value.   | Lbs.      | Value.   |
| <b>Vessel fisheries:</b>        |            |        |            |        |            |         |             |          |           |          |
| Blue-fish .....                 |            |        |            |        |            |         | 891,035     | \$29,147 | 891,035   | \$29,147 |
| Cod .....                       |            |        |            |        |            |         | 445,980     | 10,764   | 445,980   | 10,764   |
| Flounders .....                 |            |        |            |        |            |         | 26,250      | 973      | 26,250    | 973      |
| Haddock .....                   |            |        |            |        |            |         | 112,800     | 856      | 112,800   | 856      |
| Mackerel .....                  |            |        |            |        |            |         | 7,850       | 573      | 7,850     | 573      |
| Scup .....                      |            |        |            |        |            |         | 4,220       | 192      | 4,220     | 192      |
| Sea bass .....                  |            |        |            |        |            |         | 217,019     | 10,554   | 217,019   | 10,554   |
| Squeteague .....                |            |        |            |        |            |         | 500         | 15       | 500       | 15       |
| Tantog .....                    |            |        |            |        |            |         | 15,500      | 620      | 15,500    | 620      |
| <b>Total.....</b>               |            |        |            |        |            |         | 1,721,154   | 53,694   | 1,721,154 | 53,694   |
| <b>Shore fisheries:</b>         |            |        |            |        |            |         |             |          |           |          |
| Blue-fish .....                 | 3,000      | \$200  |            |        | 50,700     | \$2,525 | 4,300       | 215      | 58,000    | 2,940    |
| Cod .....                       | 4,000      | 160    |            |        |            |         |             |          | 4,000     | 160      |
| Flounders .....                 | 1,000      | 45     |            |        |            |         | 2,000       | 68       | 3,000     | 113      |
| Mackerel .....                  |            |        |            |        |            |         | 1,000       | 120      | 1,000     | 120      |
| Sea bass .....                  | 300        | 30     | 1,000      | \$50   | 1,800      | 108     | 27,200      | 1,410    | 30,300    | 1,598    |
| Squeteague .....                | 3,000      | 180    |            |        |            |         |             |          | 3,000     | 180      |
| Striped bass .....              |            |        | 1,700      | 200    |            |         |             |          | 1,700     | 200      |
| Tantog .....                    | 11,800     | 944    | 2,500      | 125    | 1,200      | 60      | 8,500       | 415      | 24,000    | 1,544    |
| Tomcod or frost-fish .....      | 500        | 25     |            |        |            |         |             |          | 500       | 25       |
| <b>Total.....</b>               | 23,600     | 1,584  | 5,200      | 375    | 53,700     | 2,693   | 43,000      | 2,228    | 125,500   | 6,880    |
| <b>Total vessel and shore..</b> | 23,600     | 1,584  | 5,200      | 375    | 53,700     | 2,693   | 1,764,154   | 55,922   | 1,846,654 | 60,574   |

Table showing, by counties, the catch by pots and spears in the fisheries of Connecticut in 1898.

| Species.                        | Fairfield. |        | New Haven. |         | Middlesex. |         | New London. |          | Total.    |          |
|---------------------------------|------------|--------|------------|---------|------------|---------|-------------|----------|-----------|----------|
|                                 | Lbs.       | Value. | Lbs.       | Value.  | Lbs.       | Value.  | Lbs.        | Value.   | Lbs.      | Value.   |
| <b>Vessel fisheries:</b>        |            |        |            |         |            |         |             |          |           |          |
| Lobsters .....                  | 8,320      | \$926  |            |         |            |         | 413,307     | \$29,356 | 421,627   | \$30,282 |
| <b>Shore fisheries:</b>         |            |        |            |         |            |         |             |          |           |          |
| Eels .....                      | 53,100     | 4,615  | 33,350     | \$2,646 | 46,220     | \$2,483 | 72,070      | 4,260    | 204,740   | 14,004   |
| Flounders .....                 | 4,000      | 200    |            |         | 1,200      | 48      |             |          | 5,200     | 248      |
| Lobsters .....                  | 36,940     | 3,815  | 36,120     | 4,253   | 31,980     | 3,804   | 571,525     | 41,594   | 676,565   | 53,466   |
| <b>Total.....</b>               | 94,040     | 8,630  | 69,470     | 6,899   | 79,400     | 6,335   | 643,595     | 45,854   | 886,505   | 67,718   |
| <b>Total vessel and shore..</b> | 102,360    | 9,556  | 69,470     | 6,899   | 79,400     | 6,335   | 1,056,902   | 75,210   | 1,303,132 | 98,000   |

NOTE.—The flounders and part of the eels shown in the above table were caught by spears.

Table showing, by counties, the catch by dredges, tongs, rakes, etc., in Connecticut in 1898.

| Species.                      | Fairfield. |           | New Haven. |           | Middlesex. |         | New London. |         | Total.     |             |
|-------------------------------|------------|-----------|------------|-----------|------------|---------|-------------|---------|------------|-------------|
|                               | Lbs.       | Value.    | Lbs.       | Value.    | Lbs.       | Value.  | Lbs.        | Value.  | Lbs.       | Value.      |
| <b>Vessel fisheries:</b>      |            |           |            |           |            |         |             |         |            |             |
| Oysters .....                 | 4,356,002  | \$409,194 | 8,921,661  | \$731,759 |            |         |             |         | 13,277,663 | \$1,140,953 |
| <b>Shore fisheries:</b>       |            |           |            |           |            |         |             |         |            |             |
| Oysters .....                 | 546,140    | 47,140    | 684,880    | 51,278    | 89,600     | \$4,850 | 35,000      | \$4,850 | 1,335,620  | 108,118     |
| Clams, hard .....             | 204,800    | 25,865    | 27,200     | 3,785     | 2,000      | 250     |             |         | 234,000    | 29,900      |
| Clams, soft .....             | 44,300     | 5,224     | 138,500    | 11,870    | 14,500     | 1,695   | 2,500       | 250     | 199,800    | 19,039      |
| Scallops .....                | 50,160     | 5,016     |            |           |            |         |             |         | 50,160     | 5,016       |
| <b>Total.....</b>             | 845,400    | 83,245    | 850,580    | 66,933    | 106,100    | 6,795   | 37,500      | 5,100   | 1,839,580  | 162,073     |
| <b>Total vessel and shore</b> | 5,201,402  | 492,439   | 9,772,241  | 798,692   | 106,100    | 6,795   | 37,500      | 5,100   | 15,117,243 | 1,303,026   |



Table showing, by counties, the catch of sword-fish by harpoons and of tomcod by minor apparatus in Connecticut in 1898.

| Fisheries.   | Species.         | Fairfield. |         | New London. |         |
|--------------|------------------|------------|---------|-------------|---------|
|              |                  | Lbs.       | Value.  | Lbs.        | Value.  |
| Vessel ..... | Sword-fish ..... |            |         | 85,980      | \$7,520 |
| Shore .....  | Tomcod .....     | 24,000     | \$1,080 |             |         |

THE MENHADEN INDUSTRY.

There were three menhaden factories in Connecticut in 1898 as compared with four in 1889; but the value of those three was only \$24,000 and they employed 52 men, whereas the four factories in 1889 were valued at \$83,200, and the factory employees numbered 82. A greater decrease has occurred in the number of steamers employed, of which there were six worth \$61,500 in 1889, and in 1898 there were but two, valued at \$14,000. The quantity of fish utilized at the factories in the latter year was 13,259,350 in number, from which \$39,763 worth of oil and scrap was prepared.

Table showing the extent of the menhaden industry of Connecticut in 1898.

| Item.                              | No.              | Value.   |
|------------------------------------|------------------|----------|
| Factories in operation .....       | 3                | \$24,000 |
| Cash capital .....                 |                  | 12,500   |
| Wages paid factory employees ..... |                  | 5,750    |
| Factory employees .....            | 52               |          |
| Men on vessels .....               | 38               |          |
| Steam vessels fishing .....        | 2                | 14,000   |
| Tonnage .....                      | 183              |          |
| Outfit .....                       |                  | 5,225    |
| Seines used on vessels .....       | 2                | 1,000    |
| Menhaden utilized .....            | 13,259,350       | 19,597   |
| Products prepared:                 |                  |          |
| Oil .....                          | 104,916 gallons. | 21,813   |
| Dry scrap .....                    | 445 tons.        | 9,790    |
| Acidulated scrap .....             | 636 do.          | 8,160    |
| Value of products .....            |                  | 39,763   |

THE WHOLESALE TRADE IN OPENED OYSTERS.

The shucking of oysters is the most extensive of the industries of Connecticut dependent on the fisheries. In 1898 this gave employment to 575 persons, and the quantity of oysters handled in the 39 establishments aggregated 509,326 gallons, worth \$487,327.

Table showing the wholesale trade in opened oysters in Connecticut in 1898.

| Items.                     | No.              | Value.    |
|----------------------------|------------------|-----------|
| Establishments .....       | 39               | \$204,500 |
| Cash capital .....         |                  | 166,750   |
| Wages paid .....           |                  | 66,750    |
| Employees .....            | 575              |           |
| Oysters sold, opened ..... | 509,326 gallons. | 487,327   |





THE ALBATROSS DREDGING, SHOWING PORT BOOM RIGGED FOR SURFACE TOWING.

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**DREDGING AND OTHER RECORDS**  
**OF THE**  
**UNITED STATES FISH COMMISSION STEAMER ALBATROSS,**  
**WITH**  
**BIBLIOGRAPHY RELATIVE TO THE WORK OF**  
**THE VESSEL.**

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**COMPILED BY C. H. TOWNSEND,**  
*Chief of Division of Fisheries, U. S. Fish Commission.*

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## CONTENTS.

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|  | Page.   |
|--|---------|
| Preface .....  | 389-392 |
| Record of dredging and trawling stations, 1883-1900 .....                                  | 393-419 |
| Record of hydrographic stations, 1883-1900 .....   | 420-476 |
| Record of surface and intermediate tow-net stations, 1887-1900 .....                       | 477-488 |
| Miscellaneous records .....  | 489     |
| Record of serial temperatures .....  | 490-500 |
| Chronological bibliography relative to the work of the <i>Albatross</i> .....              | 501-535 |
| Papers in preparation relating to the work of the <i>Albatross</i> .....                   | 536     |
| List of publications showing the titles of <i>Albatross</i> papers contained in each ..... | 537-542 |
| List of genera and species described as new in <i>Albatross</i> papers .....               | 543-559 |
| Index to <i>Albatross</i> bibliography .....   | 560-562 |

# DREDGING AND OTHER RECORDS OF THE STEAMER ALBATROSS, WITH BIBLIOGRAPHY RELATIVE TO THE WORK OF THE VESSEL.

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Compiled by C. H. TOWNSEND,  
*Chief of Division of Fisheries, U. S. Fish Commission.*

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## PREFACE.

The records of observations connected with the dredging, sounding, and other operations conducted on board the *Albatross* since the first voyage of the vessel in 1883 have been published in full from year to year in the reports of the United States Fish Commission; but being scattered through a series of bulky volumes, many of which can no longer be supplied, it has become desirable to bring them together in order to secure complete data respecting these operations. The writer, on account of his familiarity with the work of the ship, having served as naturalist during most of the cruises from 1886 to 1900, has been requested to compile the records and bibliography.

There has been a demand for the station records of the *Albatross*, not only as an aid in identifying the large collections of the vessel placed in the hands of specialists for study or deposited in museums, but as a reference book for use in connection with the numerous reports which have already appeared relating to them. In certain papers based on *Albatross* material localities are referred to by station numbers only, which the complete dredging records presented herewith will render intelligible.

The dredging records include data connected with 1,786 hauls of the dredge, beam trawl, etc., at all depths from the shore down to 4,173 fathoms (the deepest), and cover areas extending from the Banks of Newfoundland along both coasts of North and South America to Bering Sea, with limited areas in the tropical Pacific and the region from Japan to Kamchatka. The data accompanying the serial numbers of the stations show the date, position, depth, temperature of surface and bottom, the character of bottom, and the instrument used.

The hydrographic records are included here as an aid in the identification of specimens of bottom deposits. As the 4,000 or more soundings made by the vessel have already found their way upon the various charts of the Atlantic and Pacific oceans, their positions have not been platted on the accompanying maps in connection with those of the dredging stations.



The serial numbers of *Albatross* dredging and hydrographic stations, the former beginning at 2001 and the latter at 1, were carried without change or duplication from 1883 until 1899, when the series "A. A." (A. Agassiz) was added temporarily. During the cruise through the tropical Pacific all of the specimens received "A. A." numbers; these are shown, both in the dredging and hydrographic series, in columns parallel with the regular serial numbers, which are still continued.

The records of tow-net stations—not kept systematically during the earlier work of the *Albatross*—are presented for the period from 1887 to 1900 only. The numbers identifying them are not, unfortunately, continuous from year to year. They are frequently identical with the nearest dredging or hydrographic stations.

The oceanic areas explored by the *Albatross* have been platted upon the accompanying series of charts. As the vessel returned to certain regions year after year, it will be noticed that the serial numbers of the dredging stations are much scattered. Two of the maps show the positions of dredging stations in depths greater than 100 fathoms, the dredgings of less than 100 fathoms being shown on a separate map.

A list of dredging stations, by Sanderson Smith, published in 1888, contains, with earlier dredging records, several maps which show the positions of dredging stations. It is numbered 58 in the accompanying catalog of publications. Other maps showing the positions of *Albatross* dredging and hydrographic stations will be found in the papers numbered 52, 59, 71, 86, 87, 89, 117, 159, and 198. The most important of these, with respect to deep-sea dredging, is No. 86 (same map as in No. 198), showing the positions of stations from Panama to the Gulf of California.

The catalog of papers relating wholly or in part to the work of the *Albatross* numbers nearly 300 titles, including those in preparation. It is annotated briefly, the names of new genera and species described in each paper being given in full.

The yearly reports of the commanding officer of the *Albatross* contain accounts of the daily movements of the vessel. They present not only the dredging and hydrographic data, but the records on ocean temperatures, specific gravities, and other observations made on board, with many notes on the general character of dredge hauls. Reference should be made to these reports<sup>1</sup> for many details respecting the work of the *Albatross* and for numerous records not presented in this paper.

Special papers on the results of *Albatross* investigations have been published in the reports and bulletins of the U. S. Fish Commission, the proceedings, bulletins, and reports of the U. S. National Museum, the bulletins and memoirs of the Museum of Comparative Zoology, the proceedings of the Biological Society of Washington, the transactions of the Connecticut Academy of Arts and Sciences, and in the American Journal of Science. In the proceedings of the U. S. National Museum

<sup>1</sup> Numbers 14, 35, 45, 46, 52, 53, 70, 87, 99, 132, 159, 160, 185, 190.

will be found a series entitled "Scientific results of explorations by the U. S. Fish Commission steamer *Albatross*"; the bulletin and memoirs of the Museum of Comparative Zoology contain a series of "reports on the dredging operations off the west coast of Central America and Mexico to the Galapagos Islands and in the Gulf of California, under the direction of Alexander Agassiz."

The bibliographical matter is arranged chronologically and is composed almost entirely of American papers, although the titles of a few European publications will be found near the end of the catalog. The explorations of the vessel have been referred to from time to time in the reports of the *Challenger* and other European deep-sea exploring expeditions, and in the journals of geographical societies, but very few contain more than brief notes on the subject.

It has not been thought desirable to include the titles of certain official documents relating to the naval patrol of Bering Sea, in which the *Albatross* was much employed; and some unimportant references in periodicals have also been disregarded. A considerable amount of deep-sea exploration was accomplished by the U. S. Fish Commission steamer *Fish Hawk*, both before and after the launching of the *Albatross*, which has been the subject of numerous reports in the publications of the Fish Commission and elsewhere. In some reports the results of the work of the two vessels were combined.

The *Albatross* has been regularly in charge of naval commanders whose periods of service have been as follows: November, 1882, to May, 1894, Z. L. Tanner; May, 1894, to May, 1896, F. J. Drake; May, 1896, to the present time, J. F. Moser. Occasionally, when employed in special investigations, the work of the ship was placed under the direction of other persons.

During the work of the *Albatross*, which was primarily the investigation of the fisheries and fishing-grounds, dredging was carried on more or less regularly as opportunity afforded, but it has been by no means continuous from year to year. For several years, from about 1892 to 1898, comparatively little work of this character was accomplished, owing to the vessel having been frequently detailed for special lines of work in other departments of the public service. In 1889 the *Albatross* was assigned for a time to the service of the Senate Committee on Indian Affairs in Alaskan waters, and in 1891 was engaged for several months in the survey of the cable route between California and the Hawaiian Islands. In 1898 it was detailed to the Navy Department for service in the war with Spain. During the long period of the Bering Sea controversy the vessel was much employed in connection with the naval patrol of Bering Sea and in the service of the commissions created for the investigation of the fur-seal fisheries. The surveys of fishing-grounds, always accompanied with considerable use of the dredge, and the special voyages for deep-sea exploration were thus so frequently interrupted that dredging was practically discontinued for long periods.

The work of the *Albatross* from her first voyage to the present time may be stated briefly as follows:

- 1883. Fishery and deep-sea investigations off the coasts of the Middle Atlantic and New England States.
- 1884. Fishery, hydrographic, and deep-sea investigations along the Atlantic coast of the United States and in the Caribbean Sea.
- 1885. Fishery and deep-sea investigations along the Gulf and Atlantic coasts of the United States and northward to Newfoundland.
- 1886. Fishery, hydrographic, and deep-sea investigations among the Bahama Islands and along the Atlantic coast of the United States northward to Newfoundland.
- 1887. Deep-sea explorations among the Lesser Antilles and along the Atlantic coast of South America on voyage to the Pacific coast.
- 1888. Voyage around South America continued, with deep-sea explorations off the Pacific coasts of South America and Mexico and fishery investigations off the United States and Alaskan coasts.
- 1889. Fishery and deep-sea investigations off the coast of the United States and Lower California.
- 1890. Fishery investigations off the west coast of the United States and in Bering Sea.
- 1891. Deep-sea explorations, west coast of Mexico and Central America and off the Galapagos Islands (winter).  
Cruise with Eering Sea Commission to the Pribilof Islands (summer).  
Fishery investigations off the coast of Washington and survey of cable route between California and Hawaiian Islands (fall).
- 1892. Hawaiian cable survey continued. Fur-seal and fishery investigations, Alaskan coast, and voyage to Commander Islands.
- 1893. Fur-seal and fishery investigations in Alaskan waters and patrol of Bering Sea.
- 1894. Fur-seal investigations and patrol of Bering Sea.
- 1895. Fur-seal investigations in Alaskan waters and voyage to Commander Islands.
- 1896. Fur-seal investigations, Pribilof Islands, Commander Islands, Okhotsk Sea, Kuril Islands, Japan coast, and return voyage via Hawaiian Islands.
- 1897. Fishery investigations, west coast of the United States, and special salmon fishery investigations in Alaska.
- 1898. In service of Navy Department during war with Spain.
- 1899-1900. Voyage of exploration through the tropical Pacific to Japan. Salmon fishery investigations in Alaska.
- 1901. Salmon fishery investigations in southeast Alaska.

While it is scarcely expected that the present compilation will be free from errors, it is hoped that it will be of substantial service not only in connection with the study of the ever-increasing collections of the *Albatross*, but as a contribution to the general subject of oceanography.

WASHINGTON, September 27, 1901.

*List of abbreviations used in the dredging and hydrographic records to denote the instruments employed and the characters of the bottom.*

| Abbreviation. | Meaning.         | Abbreviation. | Meaning.    | Abbreviation. | Meaning.                        |
|---------------|------------------|---------------|-------------|---------------|---------------------------------|
| bk .....      | black.           | lge .....     | large.      | slat .....    | slate color.                    |
| br .....      | brown.           | lt .....      | light.      | sml .....     | small.                          |
| brk .....     | broken.          | m .....       | mud.        | sp .....      | specks.                         |
| bu .....      | blue.            | mang ..       | manganese.  | st .....      | stones.                         |
| c .....       | clay.            | min ..        | mineral.    | stf .....     | stiff.                          |
| choc .....    | chocolate color. | nod .....     | nodules.    | stk .....     | sticky.                         |
| co .....      | coral.           | oz .....      | ooze.       | vol .....     | volcanic.                       |
| crs .....     | coarse.          | p .....       | pebbles.    | wh .....      | white.                          |
| dd .....      | dead.            | part ..       | particles.  | yl .....      | yellow.                         |
| dk .....      | dark.            | pter ..       | pteropods.  | L. B. T ..    | Large beam trawl.               |
| fne .....     | fine.            | pum ..        | pumice.     | S. B. T ..    | Small beam trawl.               |
| for .....     | foraminifera.    | r .....       | rock.       | Bl. Dr ..     | Blake dredge (deep sea dredge). |
| frag .....    | fragments.       | rad ..        | radiolaria. | Sh. Dr ..     | Ship's dredge (mud bag).        |
| g .....       | gravel.          | rd .....      | red.        | Tgls .....    | Tangles.                        |
| glob .....    | globigerina.     | rky .....     | rocky.      | surf .....    | surface townet.                 |
| gn .....      | green.           | rot .....     | rotten.     | 4' Blk ..     | 4-foot Blake beam trawl.        |
| gy .....      | gray.            | s .....       | sand.       | 5½' Blk ..    | 5½-foot Blake beam trawl.       |
| hrd .....     | hard.            | sft .....     | soft.       | 8' Tnr ..     | 8-foot Tanner beam trawl.       |
| lav .....     | lava.            | sh .....      | shells.     |               |                                 |

## DREDGING AND TRAWLING RECORDS.

*Record of dredging and trawling stations of the Albatross, 1883-1900.*

| Serial No.                                 | Date.   | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.               | Instrument used, etc. |
|--|---------|-----------|----------|---------------|--------------|--------|-------------------------------|-----------------------|
|  |         | Lat. N.   | Long. W. |               |              |        |                               |                       |
| Atlantic Ocean, Cape Hatteras to Cape May. |         |           |          |               |              |        |                               |                       |
| 1883.                                      |         |           |          |               |              |        |                               |                       |
| 2001                                       | Mar. 22 | 37 46 30  | 74 00 00 | ° F.          | ° F.         | Fms    | gn. m                         | Deep-sea trawl.       |
| 2002                                       | Mar. 23 | 37 20 42  | 74 17 36 | 48            |              | 641    | gn. m                         | Beam trawl.           |
| 2003                                       | Mar. 23 | 37 16 30  | 74 20 36 | 50            |              | 641    |                               | Do.                   |
| 2004                                       | Mar. 23 | 37 19 45  | 74 26 06 | 51            |              | 102    | gn. m., sh                    | Do.                   |
| 2005                                       | Mar. 23 | 37 18 11  | 74 27 35 | 50            |              | 82     | bu. m. and s., brk. sh        | Do.                   |
| 2006                                       | Mar. 23 | 37 19 11  | 74 26 06 | 50            |              | 512    | bu. m., fine. s.              | Do.                   |
| 2007                                       | Apr. 27 | 35 17 00  | 75 13 00 | 56            | 68           | 15     | fine. s.                      | Do.                   |
| 2008                                       | Apr. 27 | 35 09 40  | 75 04 36 | 72            | 74½          | 92     | bu. m., fine. s.              | Do.                   |
| 2009                                       | Apr. 28 | 35 29 35  | 74 46 45 | 69            |              | 531    |                               | Deep-sea trawl.       |
| 2010                                       | Apr. 28 | 35 30 00  | 74 44 45 | 61            |              | 890    |                               | Do.                   |
| 2011                                       | Apr. 30 | 36 38 30  | 74 40 10 | 48            |              | 81     | s. and brk. sh                | Beam trawl.           |
| 2012                                       | Apr. 30 | 36 41 15  | 74 39 50 | 52            |              | 66½    |                               | Rake dredge.          |
| 2013                                       | Apr. 30 | 36 45 30  | 74 25 30 | 48            |              | 888    | gn. m                         | Beam trawl.           |
| 2014                                       | May 1   | 36 41 05  | 74 38 55 | 47            |              | 373    | gn. m., fine. s.              | Do.                   |
| 2015                                       | May 5   | 37 31 00  | 74 53 30 | 48            |              | 19     | fine. s. and sh               | Do.                   |
| 2016                                       | May 5   | 37 31 00  | 74 52 36 | 47            | 45½          | 19     | fine. s. and sh               | Do.                   |
| 2017                                       | May 5   | 37 30 48  | 74 51 24 | 46½           | 45½          | 18     | fine. s. and sh               | Rake dredge.          |
| 2018                                       | May 7   | 37 12 22  | 74 20 04 | 54            | 39           | 788    | bu. m                         | Deep-sea trawl.       |
| 2019                                       | May 7   | 37 13 52  | 74 23 52 | 52½           | 39           | 600    | bu. m                         | Do.                   |
| 2020                                       | May 21  | 37 37 50  | 74 15 30 | 54            |              | 143    | bu. m., fine. s.              | Beam trawl.           |
| 2021                                       | May 21  | 37 36 00  | 74 15 00 | 54            | 45           | 179    | bu. m., fine. s.              | Do.                   |
| 2022                                       | May 21  | 37 32 00  | 74 13 20 | 52            | 40           | 487    | bu. m                         | Deep-sea trawl.       |
| 2023                                       | May 21  | 37 48 00  | 74 01 30 | 56            |              | 377    | blk. m., fine. s.             | Beam trawl.           |
| Cape May to Nantucket.                     |         |           |          |               |              |        |                               |                       |
| 2024                                       | May 25  | 40 02 10  | 70 27 00 | 49            | 40½          | 222    | dk. gn. m                     | Beam trawl.           |
| 2025                                       | May 25  | 40 02 00  | 70 27 00 | 49            | 40½          | 239    | gn. m., fine. s.              | Do.                   |
| 2026                                       | May 25  | 40 04 00  | 70 28 50 | 49            | 48           | 131    | gn. m. and s.                 | Do.                   |
| 2027                                       | May 25  | 39 58 25  | 70 37 00 | 52            | 43           | 198    | bu. m. and s.                 | Do.                   |
| 2028                                       | May 25  | 39 57 50  | 70 32 00 | 52            | 41           | 209    | bu. m                         | Do.                   |
| 2029                                       | May 25  | 39 42 00  | 70 47 00 | 53            | 38½          | 1,168  | gy. m                         | Dredge tangles.       |
| 2030                                       | May 26  | 39 29 45  | 71 43 00 | 49            |              | 588    | bu. m                         | Beam trawl.           |
| 2031                                       | May 26  | 39 29 00  | 72 19 55 | 50            | 49½          | 74     | gy. m., blk. and wh. s        | Do.                   |
| 2032                                       | May 26  | 39 29 00  | 72 19 40 | 50            | 47½          | 74     | gn. m., fine. s., blk. sp     | Do.                   |
| 2033                                       | May 26  | 39 32 30  | 72 18 35 | 49½           | 41           | 379    | gn. m                         | Do.                   |
| 2034                                       | July 17 | 39 27 10  | 69 56 20 | 72            | 38           | 1,346  | glob. oz                      | Do.                   |
| 2035                                       | July 17 | 39 26 16  | 70 02 37 | 71            |              | 1,362  | glob. oz                      | Do.                   |
| 2036                                       | July 18 | 38 52 40  | 69 24 40 | 76            | 38           | 1,735  | glob. oz                      | Do.                   |
| 2037                                       | July 18 | 38 53 00  | 69 23 30 | 76            | 38           | 1,731  | glob. oz                      | Do.                   |
| 2038                                       | July 26 | 38 30 30  | 69 08 25 | 76½           |              | 2,033  | glob. oz                      | Deep sea trawl.       |
| 2039                                       | July 28 | 38 19 26  | 68 20 20 | 81            |              | 2,369  | glob. oz                      | Do.                   |
| 2040                                       | July 29 | 38 35 13  | 68 16 00 | 76            |              | 2,226  | glob. oz                      | Do.                   |
| 2041                                       | July 30 | 39 22 50  | 68 25 00 | 72            | 38           | 1,608  | glob. oz                      | Do.                   |
| 2042                                       | July 30 | 39 33 00  | 68 26 45 | 71            | 38½          | 1,555  | glob. oz                      | Do.                   |
| 2043                                       | July 30 | 39 49 00  | 68 28 30 | 72            | 38½          | 1,467  | glob. oz                      | Do.                   |
| 2044                                       | July 31 | 40 00 30  | 68 37 20 | 72            | 39           | 1,067  | oz                            | Do.                   |
| 2045                                       | July 31 | 40 04 20  | 68 43 50 | 72            | 40           | 373    | bu. m., fine. sh              | Beam trawl.           |
| 2046                                       | July 31 | 40 02 49  | 68 49 00 | 72            | 40           | 407    | bu. m                         | Do.                   |
| 2047                                       | July 31 | 40 02 30  | 68 49 40 | 72            | 52           | 389    | bu. m                         | Deep-sea trawl.       |
| 2048                                       | July 31 | 40 02 00  | 68 50 30 | 72            | 29           | 547    | crs. s., m., and g            | Do.                   |
| 2049                                       | Aug. 1  | 39 43 40  | 69 20 00 | 71            | 39           | 1,025  | bu. m                         | Do.                   |
| 2050                                       | Aug. 1  | 39 42 50  | 69 21 20 | 72            | 44½          | 1,050  | glob. oz                      | Beam trawl.           |
| 2051                                       | Aug. 1  | 39 41 00  | 69 20 20 | 72            | 39           | 1,106  | bu. m. and glob. oz           | Do.                   |
| 2052                                       | Aug. 1  | 39 40 05  | 69 21 25 | 73            | 45           | 1,098  | glob. oz                      | Do.                   |
| Nantucket to Cape Sable, N. S.             |         |           |          |               |              |        |                               |                       |
| 2053                                       | Aug. 29 | 42 02 00  | 68 27 00 | 61            |              | 105    | bu. m                         | Beam trawl.           |
| 2054                                       | Aug. 29 | 42 03 30  | 68 26 00 | 64            |              | 105    | bu. m                         | Dredge.               |
| 2055                                       | Aug. 30 | 42 32 00  | 68 17 00 | 60            |              | 99.5   | bu. m., s., and crs. g.       | Do.                   |
| 2056                                       | Aug. 30 | 42 01 30  | 68 01 00 | 57            |              | 97     | bu. m., fine. s., and crs. g. | Do.                   |
| 2057                                       | Aug. 30 | 42 01 00  | 63 00 30 | 57            |              | 86     | crs. s., blk. sp., brk. sh    | Beam trawl.           |
| 2058                                       | Aug. 30 | 41 57 30  | 67 58 00 | 58            | 50           | 35     | gy. s                         | Do.                   |
| 2059                                       | Aug. 31 | 42 05 00  | 66 46 15 | 55            |              | 41     | bu. m. and s                  | Do.                   |
| 2060                                       | Aug. 31 | 42 10 00  | 66 46 15 | 55            |              | 123    | gy. s., blk. sp., brk. sh     | Do.                   |
| 2061                                       | Aug. 31 | 42 10 00  | 66 47 45 | 54            | 40           | 115    | gy. s., blk. sp., bu. m.      | Do.                   |
| 2062                                       | Aug. 31 | 42 17 00  | 66 37 15 | 61            | 42           | 150    | s. and g                      | Do.                   |
| 2063                                       | Aug. 31 | 42 23 00  | 66 23 00 | 57½           | 46           | 141    | s. and crs. g                 | Do.                   |
| 2064                                       | Aug. 31 | 42 25 40  | 66 08 35 | 59            |              | 122    | crs. s. and g                 | Do.                   |
| 2065                                       | Aug. 31 | 42 27 00  | 66 00 45 | 55            | 44½          | 80     | s., g., and brk. sh           | Rake dredge.          |

a First dredging station occupied by the *Albatross*.

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                     | Date.    | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.            | Instrument used, etc. |
|--------------------------------|----------|-----------|----------|---------------|--------------|--------|----------------------------|-----------------------|
|                                |          | Lat. N.   | Long. W. |               |              |        |                            |                       |
| Nantucket to Cape Sable, N. S. |          |           |          |               |              |        |                            |                       |
|                                | 1883.    | ° ' "     | ° ' "    | ° F.          | ° F.         | Fms.   |                            |                       |
| 2066                           | Sept. 1  | 42 19 40  | 65 49 30 | 54            | 43.5         | 65     | s., st. and g.             | Rake dredge.          |
| 2067                           | Sept. 1  | 42 15 25  | 65 48 40 | 56            | 46           | 122    | s. and g.                  | Beam trawl.           |
| 2068                           | Sept. 1  | 42 03 00  | 65 48 40 | 56            | 42           | 131    | s., fne. g., and c.        | Do.                   |
| 2069                           | Sept. 1  | 41 54 50  | 65 48 35 | 56½           | 42           | 101    | s., st., g., p. and c.     | Grapnel dredge.       |
| 2070                           | Sept. 1  | 41 55 30  | 65 47 10 | 57            | 42.5         | 113    | p. and c.                  | Bar and tangles.      |
| 2071                           | Sept. 1  | 41 56 20  | 65 48 40 | 57            | 42           | 113    | p. and c.                  | Grapnel dredge.       |
| 2072                           | Sept. 2  | 41 53 00  | 65 35 00 | 56            | 39           | 858    | gy. m.                     | Beam trawl.           |
| 2073                           | Sept. 2  | 41 54 15  | 65 39 00 | 58            | 40           | 586.5  | gy. s.                     | Do.                   |
| 2074                           | Sept. 3  | 41 43 00  | 65 21 50 | 69            | 40           | 1,309  | m. and st.                 | Do.                   |
| 2075                           | Sept. 3  | 41 40 30  | 65 35 00 | 58            | 39           | 855    | glob. oz.                  | Do.                   |
| 2076                           | Sept. 4  | 41 13 00  | 66 00 50 | 69            | 40           | 906    | bu. m.                     | Do.                   |
| 2077                           | Sept. 4  | 41 09 40  | 66 02 20 | 68            | 39           | 1,255  | bu. m.                     | Do.                   |
| 2078                           | Sept. 4  | 41 11 30  | 66 12 20 | 66            | 40           | 499    | gy. m. and s.              | Do.                   |
| 2079                           | Sept. 4  | 41 13 00  | 66 19 50 | 67½           | 45           | 75     | wh. s.                     | Do.                   |
| 2080                           | Sept. 4  | 41 13 00  | 66 21 50 | 67½           | 46           | 55     | gy. s.                     | Do.                   |
| 2081                           | Sept. 4  | 41 10 20  | 66 30 20 | 56            | 46           | 50     | wh. s., blk. sp.           | Do.                   |
| 2082                           | Sept. 4  | 41 09 50  | 66 31 50 | 55            | 46.5         | 49     | crs. yl. s.                | Do.                   |
| 2083                           | Sept. 5  | 40 26 40  | 67 05 15 | 72            | 40           | 959    | gy. m.                     | Do.                   |
| 2084                           | Sept. 5  | 40 16 50  | 67 05 15 | 78½           | 40           | 1,290  | bu. m. and s.              | Do.                   |
| 2085                           | Sept. 20 | 40 05 00  | 70 34 45 | 68            | 50           | 70     | bu. m.                     | Do.                   |
| 2086                           | Sept. 20 | 40 05 05  | 70 35 00 | 67            | 52.5         | 69     | bu. m., gy. s.             | Do.                   |
| 2087                           | Sept. 20 | 40 06 50  | 70 34 15 | 67            | 50           | 65     | gn. m., wh. s.             | Do.                   |
| 2088                           | Sept. 20 | 39 59 15  | 70 36 30 | 68            | 48           | 143    | yl. s.                     | Do.                   |
| 2089                           | Sept. 20 | 39 58 50  | 70 39 40 | 69            | 45           | 168    | gy. s.                     | Do.                   |
| 2090                           | Sept. 20 | 39 59 40  | 70 41 10 | 68            | 48.5         | 140    | gy. s., brk. sh.           | Do.                   |
| Cape Hatteras to Nantucket.    |          |           |          |               |              |        |                            |                       |
| 2091                           | Sept. 21 | 40 01 50  | 70 59 00 | 69            | 49           | 117    | gn. m.                     | Beam trawl.           |
| 2092                           | Sept. 21 | 39 58 35  | 71 00 30 | 67½           | 45           | 197    | gn. m.                     | Do.                   |
| 2093                           | Sept. 21 | 39 42 50  | 71 01 20 | 69            | 39           | 1,000  | foraminifera, s., m.       | Do.                   |
| 2094                           | Sept. 21 | 39 44 30  | 71 04 00 | 68            | 38.5         | 1,022  | foraminifera, s., m.       | Do.                   |
| 2095                           | Sept. 30 | 39 29 00  | 70 58 40 | 69½           | 40           | 1,342  | glob. oz.                  | Do.                   |
| 2096                           | Sept. 30 | 39 22 20  | 70 52 20 | 69            | 37.5         | 1,451  | glob. oz.                  | Do.                   |
| 2097                           | Oct. 1   | 37 56 20  | 70 57 30 | 72½           | 40           | 1,917  | glob. oz.                  | Do.                   |
| 2098                           | Oct. 1   | 37 40 30  | 70 37 30 | 72½           | 40           | 2,221  | glob. oz.                  | Do.                   |
| 2099                           | Oct. 2   | 37 12 20  | 69 39 00 | 82            | 40           | 2,949  | glob. oz.                  | Do.                   |
| 2100                           | Oct. 3   | 39 22 60  | 68 34 30 | 69            | 37.5         | 1,628  | glob. oz.                  | Do.                   |
| 2101                           | Oct. 3   | 39 18 30  | 68 24 00 | 67            | 37           | 1,686  | glob. oz.                  | Do.                   |
| 2102                           | Nov. 5   | 38 44 00  | 72 38 00 | 62½           | 39           | 1,209  | glob. oz.                  | Do.                   |
| 2103                           | Nov. 5   | 38 47 20  | 72 37 00 | 62            | 39           | 1,091  | glob. oz.                  | Do.                   |
| 2104                           | Nov. 5   | 38 48 00  | 72 40 30 | 63            | 41.5         | 991    | bu. m.                     | Do.                   |
| 2105                           | Nov. 6   | 37 50 00  | 73 03 50 | 63            | 41           | 1,395  | glob. oz.                  | Do.                   |
| 2106                           | Nov. 6   | 37 41 20  | 73 03 20 | 63            | 42.5         | 1,497  | glob. oz.                  | Do.                   |
| 2107                           | Nov. 9   | 35 19 30  | 75 15 20 | 76            | 40           | 16.5   | fne. dk. gy. s., small sh. | Do.                   |
| 2108                           | Nov. 9   | 35 16 00  | 75 02 30 | 78½           | 66           | 48     | bu. m., crs. s.            | Do.                   |
| 2109                           | Nov. 9   | 35 14 20  | 74 59 10 | 76            | 50.5         | 142    | bu. m.                     | Do.                   |
| 2110                           | Nov. 9   | 35 12 10  | 74 57 15 | 75½           | 40           | 516    | bu. m.                     | Do.                   |
| 2111                           | Nov. 9   | 35 09 50  | 74 57 40 | 76            | 40           | 938    | gn. m.                     | Do.                   |
| 2112                           | Nov. 10  | 35 20 50  | 75 18 00 | 70            | 73.5         | 15.5   | s., blk. sp.               | Do.                   |
| 2113                           | Nov. 10  | 35 20 30  | 75 19 00 | 70            | 72.5         | 15     | m., blk. s.                | Do.                   |
| 2114                           | Nov. 10  | 35 20 00  | 75 20 00 | 70            | 72           | 14     | m., blk. s.                | Do.                   |
| 2115                           | Nov. 11  | 35 49 30  | 74 34 45 | 78            | 39           | 843    | m., fne. s.                | Do.                   |
| 2116                           | Nov. 11  | 35 45 23  | 74 31 25 | 77            | 39           | 888    | bu. m., fne. s.            | Do.                   |
| Caribbean Sea.                 |          |           |          |               |              |        |                            |                       |
| 2117                           | Jan. 27  | 15 24 40  | 63 31 30 | 78            | 39.75        | 683    | yl. m. fne. s.             | L. B. T.              |
| 2118                           | Jan. 28  | 13 32 40  | 62 54 00 | 77            | 39.25        | 690    | gy. m. bk. s.              | Do.                   |
| 2119                           | Jan. 29  | 11 48 30  | 62 17 30 | 77            | 39.25        | 1,140  | gy. m.                     | Do.                   |
| 2120                           | Jan. 30  | 11 07 00  | 62 14 30 | 76            | 39.25        | 73     | bu. m.                     | Dr. Tgl.              |
| 2121                           | Feb. 3   | 10 37 40  | 61 42 40 | 77            | 67           | 31     | dk. slate col. m.          | L. B. T.              |
| 2122                           | Feb. 3   | 10 37 00  | 61 44 22 | 77            | 73           | 34     | dk. slate-col. m.          | Do.                   |
| 2123                           | Feb. 3   | 10 42 02  | 61 48 48 | 78            | 64.5         | 117    | bu. m.                     | Do.                   |
| 2124                           | Feb. 18  | 11 34 30  | 69 02 10 | 74            | 59.5         | 122    | fne. sh. gn. m.            | Sh. Dr.               |
| 2125                           | Feb. 18  | 11 43 00  | 69 09 30 | 74            | 50.7         | 208    | yl. m. s. bk. sp.          | S. B. T.              |
| 2126                           | Feb. 19  | 13 17 45  | 70 01 00 | 77            | 39.3         | 1,701  | yl. m. crs. s. for         | Do.                   |
| 2127                           | Feb. 25  | 19 45 00  | 75 04 00 | 77            | 49.5         | 1,639  | gn. m.                     | L. B. T.              |
| 2128                           | Feb. 27  | 19 55 46  | 75 49 23 | 78            | 49.5         | 400    | bu. m. fne. s.             | Tgl. bar.             |
| 2129                           | Feb. 27  | 19 56 04  | 75 48 55 | 78            | 49.5         | 274    | bu. m. fne. s.             | Do.                   |
| 2130                           | Feb. 27  | 19 56 25  | 75 49 49 | 79            | 49.5         | 175    | gy. m. s. brk. sh.         | Do.                   |
| 2131                           | Feb. 27  | 19 56 44  | 75 50 49 | 79            | 49.5         | 202    | hrd. crs. s.               | Do.                   |
| 2132                           | Feb. 27  | 19 55 38  | 75 49 16 | 79            | 49.5         | 478    | yl. m. brk. sh.            | Do.                   |
| 2133                           | Feb. 27  | 19 55 55  | 75 48 03 | 79            | 49.5         | 290    | wh. s. brk. sh.            | Do.                   |
| 2134                           | Feb. 27  | 19 56 06  | 75 47 32 | 78            | 49.5         | 254    | wh. s. brk. sh.            | Do.                   |
| 2135                           | Feb. 27  | 19 55 58  | 75 47 07 | 77            | 49.5         | 250    | hrd. co.                   | Do.                   |
| 2136                           | Feb. 29  | 17 43 40  | 75 38 25 | 78            | 49.5         | 52     | co. brk. sh.               | Do.                   |
| 2137                           | Feb. 29  | 17 44 50  | 75 39 20 | 78            | 49.5         | 47     | co. brk. sh.               | Do.                   |
| 2138                           | Feb. 29  | 17 44 05  | 75 39 00 | 78            | 49.5         | 23     | co. brk. sh.               | Do.                   |



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                  | Date.   | Position.                     |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom. | Instrument used, etc. |
|-----------------------------|---------|-------------------------------|----------|---------------|--------------|--------|-----------------|-----------------------|
|                             |         | Lat. N.                       | Long. W. |               |              |        |                 |                       |
| Caribbean Sea.              |         |                               |          |               |              |        |                 |                       |
|                             | 1884.   | ° ' "                         | ° ' "    | ° F.          | ° F.         | Fms.   |                 |                       |
| 2139                        | Mar. 11 | 17 52 00                      | 76 45 30 | 79            | 62.3         | 215    | bk. m           | Tgl. bar.             |
| 2140                        | Mar. 11 | 17 36 10                      | 76 46 05 | 78            | 39.7         | 966    | s               | S. B. T.              |
| 2141                        | Mar. 12 | 17 25 00                      | 75 59 55 | 77            | -----        | 5      | co. s           | Tgl. bar.             |
| 2142                        | Mar. 25 | 9 30 15                       | 76 20 30 | 81            | -----        | 42     | gn. m. s        | S. B. T.              |
| 2143                        | Mar. 23 | 9 30 45                       | 76 25 30 | 80            | -----        | 155    | gn. m           | Do.                   |
| 2144                        | Mar. 25 | 9 49 00                       | 79 31 30 | 79            | -----        | 896    | gn. m           | L. B. T.              |
| 2145                        | Apr. 2  | 9 27 00                       | 79 54 00 | 79            | -----        | 25     | gn. m. brk. sh  | Sh. Dr.               |
| 2146                        | Apr. 2  | 9 32 00                       | 79 54 30 | 79            | -----        | 34     | brk. sh         | L. B. T.              |
| 2147                        | Apr. 2  | 9 32 20                       | 79 54 45 | 79            | 78.5         | 34     | co              | Tgl. bar.             |
| 2148                        | Apr. 2  | 9 35 00                       | 79 55 30 | 79            | 78.25        | 130    | hrd             | Do.                   |
| 2149                        | Apr. 4  | 13 01 30                      | 81 25 00 | 78            | 39.7         | 992    | yl. m           | Do.                   |
| 2150                        | Apr. 9  | 13 34 45                      | 81 21 10 | 78            | 45.75        | 382    | wh. crs. s      | Dr. and Tgl. bar.     |
| 2151                        | Apr. 10 | 15 28 39                      | 80 36 00 | 78            | 40.2         | 653    | yl. for. oz     | L. B. T.              |
| Off Havana, Cuba.           |         |                               |          |               |              |        |                 |                       |
| 2152                        | Apr. 30 | 2½ miles NW. of Havana Light. |          | 77            | 49           | 387    | co              | Tgl. bar              |
| 2153                        | Apr. 30 | 23 10 19                      | 82 23 10 | 77            | 55.8         | 283    | co              | Do.                   |
| 2154                        | Apr. 30 | 23 10 16                      | 82 22 54 | 77            | 59.6         | 310    | co              | Do.                   |
| 2155                        | Apr. 30 | 23 10 21                      | 82 22 44 | 77            | -----        | 300    | co              | Do.                   |
| 2156                        | Apr. 30 | 23 10 35                      | 82 21 55 | 77            | 59.8         | 278    | co              | Do.                   |
| 2157                        | Apr. 30 | 23 10 04                      | 82 21 07 | 77            | -----        | 29     | -----           | Do.                   |
| 2158                        | Apr. 30 | 23 10 25                      | 82 20 36 | 77            | -----        | 86     | -----           | Do.                   |
| 2159                        | Apr. 30 | 23 10 39                      | 82 20 08 | 77            | -----        | 98     | co              | Do.                   |
| 2160                        | Apr. 30 | 23 10 31                      | 82 20 37 | 77            | -----        | 167    | co              | Do.                   |
| 2161                        | Apr. 30 | 23 10 36                      | 82 20 28 | 78            | -----        | 146    | co              | Do.                   |
| 2162                        | Apr. 30 | 23 10 30                      | 82 20 25 | 78            | -----        | 122    | co              | Do.                   |
| 2163                        | Apr. 30 | 23 10 31                      | 82 20 29 | 78            | -----        | 133    | co              | Do.                   |
| 2164                        | May 1   | 23 10 39                      | 82 20 29 | 77            | -----        | 192    | co              | Do.                   |
| 2165                        | May 1   | 23 10 39                      | 82 20 28 | 77            | -----        | 200    | co              | Do.                   |
| 2166                        | May 1   | 23 10 36                      | 82 20 30 | 77            | 71.9         | 196    | co              | Do.                   |
| 2167                        | May 1   | 23 10 40                      | 82 20 30 | 78            | -----        | 201    | co              | Do.                   |
| 2168                        | May 1   | 23 10 36                      | 82 20 20 | 78            | -----        | 122    | co              | Do.                   |
| 2169                        | May 1   | 23 10 28                      | 82 20 27 | 78            | -----        | 78     | co              | Do.                   |
| Cape Hatteras to Nantucket. |         |                               |          |               |              |        |                 |                       |
| 2170                        | July 20 | 37 57 00                      | 73 53 30 | 71            | -----        | 155    | gy. s           | Tgl. bar.             |
| 2171                        | July 20 | 37 59 30                      | 73 48 40 | 75            | 39.5         | 444    | gn. m           | Do.                   |
| 2172                        | July 20 | 38 01 15                      | 73 44 00 | 76            | 39           | 568    | gn. m           | Do.                   |
| 2173                        | July 21 | 37 57 00                      | 72 34 00 | 70            | 37           | 1,600  | glob. oz        | Do.                   |
| 2174                        | July 21 | 38 15 00                      | 72 03 00 | 76            | -----        | 1,594  | gy. m           | Do.                   |
| 2175                        | July 22 | 39 33 00                      | 72 18 30 | 68            | 40.5         | 452    | gn. m           | Do.                   |
| 2176                        | July 22 | 39 32 30                      | 72 21 30 | 68            | 41           | 302    | bk. m           | S. B. T.              |
| 2177                        | July 22 | 39 33 40                      | 72 08 45 | 68            | 52           | 87     | gn. m. s        | L. B. T.              |
| 2178                        | July 22 | 39 29 00                      | 72 05 15 | 68            | 42.3         | 229    | gn. m. s        | Do.                   |
| 2179                        | July 23 | 39 30 10                      | 71 50 00 | 67            | 39.5         | 510    | bk. m           | Do.                   |
| 2180                        | July 23 | 39 29 50                      | 71 49 30 | 68            | 39.5         | 523    | bk. m           | Do.                   |
| 2181                        | July 23 | 39 29 00                      | 71 46 00 | 68            | 39           | 693    | gy. m. fine. s  | Do.                   |
| 2182                        | July 23 | 39 25 30                      | 71 44 00 | 68            | 39           | 861    | gn. m           | Do.                   |
| 2183                        | Aug. 2  | 39 57 45                      | 70 56 30 | 68            | 44.5         | 195    | gn. m. s        | Do.                   |
| 2184                        | Aug. 2  | 40 00 15                      | 70 55 30 | 70            | 48.9         | 136    | gn. m. s        | Do.                   |
| 2185                        | Aug. 2  | 40 00 45                      | 70 54 15 | 69            | 51           | 129    | gn. m. s        | Do.                   |
| 2186                        | Aug. 2  | 39 52 15                      | 70 55 30 | 69            | 39.7         | 353    | gn. m. s        | Do.                   |
| 2187                        | Aug. 3  | 39 49 30                      | 71 10 00 | 68            | 39.7         | 420    | gn. m. s        | Do.                   |
| 2188                        | Aug. 3  | 39 54 30                      | 71 08 00 | 70            | 42.7         | 235    | gn. m. s        | Lo.                   |
| 2189                        | Aug. 4  | 39 49 30                      | 70 26 00 | 71            | 39.7         | 600    | gn. m. s        | Do.                   |
| 2190                        | Aug. 4  | 39 40 00                      | 70 20 15 | 73            | -----        | 1,180  | glob. oz        | Do.                   |
| 2191                        | Aug. 4  | 39 45 30                      | 70 17 00 | 73            | -----        | 961    | gn. m           | Lost trawl.           |
| 2192                        | Aug. 5  | 39 46 30                      | 70 14 45 | 72            | 38.6         | 1,060  | gy. oz          | L. B. T.              |
| 2193                        | Aug. 5  | 39 44 30                      | 70 10 30 | 73            | 38.4         | 1,122  | gn. m           | Do.                   |
| 2194                        | Aug. 5  | 39 43 45                      | 70 07 00 | 74            | 38.4         | 1,140  | oz              | Do.                   |
| 2195                        | Aug. 5  | 39 44 00                      | 70 03 00 | 74            | 38.4         | 1,058  | gn. m           | Do.                   |
| 2196                        | Aug. 6  | 39 35 00                      | 69 44 00 | 74            | 38           | 1,230  | gn. m           | Do.                   |
| 2197                        | Aug. 6  | 39 56 30                      | 69 43 20 | 74            | 52.3         | 84     | s. brk. sh      | Do.                   |
| 2198                        | Aug. 6  | 39 56 30                      | 69 43 20 | 74            | 52.3         | 84     | s. brk. sh      | Do.                   |
| 2199                        | Aug. 6  | 39 57 30                      | 69 41 10 | 74            | -----        | 78     | gy. s           | Do.                   |
| 2200                        | Aug. 6  | 39 53 30                      | 69 43 20 | 74            | 45           | 148    | crs. s. bk. sp  | Do.                   |
| 2201                        | Aug. 19 | 39 39 45                      | 71 35 15 | 66            | 39.5         | 538    | bu. m           | Do.                   |
| 2202                        | Aug. 19 | 39 38 00                      | 71 39 45 | 67            | 39.1         | 515    | gn. m           | Do.                   |
| 2203                        | Aug. 19 | 39 34 15                      | 71 41 15 | 74            | 38.9         | 705    | gn. m. s        | Do.                   |
| 2204                        | Aug. 19 | 39 30 30                      | 71 44 30 | 74            | 39.1         | 728    | br. m           | Do.                   |
| 2205                        | Aug. 20 | 39 35 00                      | 71 18 45 | 73            | 38.1         | 1,073  | gy. oz          | Do.                   |
| 2206                        | Aug. 20 | 39 35 00                      | 71 24 30 | 74            | 38.4         | 1,043  | gn. m           | Do.                   |
| 2207                        | Aug. 20 | 39 35 33                      | 71 31 45 | 74            | 38.6         | 1,061  | gn. m           | Do.                   |
| 2208                        | Aug. 21 | 39 33 00                      | 71 16 15 | 74            | 38.4         | 1,178  | gn. m           | Do.                   |
| 2209                        | Aug. 21 | 39 34 45                      | 71 31 30 | 74            | 39.5         | 1,080  | gn. m. s        | Do.                   |
| 2210                        | Aug. 21 | 39 37 45                      | 71 18 45 | 74            | 38.1         | 991    | glob. oz        | Do.                   |
| 2211                        | Aug. 21 | 39 35 00                      | 71 18 00 | 74            | 38.3         | 1,064  | gy. oz          | Do.                   |
| 2212                        | Aug. 22 | 39 59 30                      | 70 30 45 | 71            | 40           | 428    | gn. m           | Do.                   |



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                  | Date.    | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc. |
|-----------------------------|----------|-----------|----------|---------------|--------------|--------|---------------------|-----------------------|
|                             |          | Lat. N.   | Long. W. |               |              |        |                     |                       |
| Cape Hatteras to Nantucket. |          |           |          |               |              |        |                     |                       |
|                             | 1884.    | ° ' "     | ° ' "    | ° F.          | ° F.         | Fms.   |                     |                       |
| 2213                        | Aug. 22  | 39 58 30  | 70 30 00 | 71            | 39.5         | 384    | gn. m               | L. B. T.              |
| 2214                        | Aug. 22  | 39 57 00  | 70 32 00 | 74            | 39.5         | 475    | gn. m               | Do.                   |
| 2215                        | Aug. 22  | 39 49 15  | 70 31 45 | 74            |              | 578    | lost ther.          | Do.                   |
| 2216                        | Aug. 22  | 39 47 00  | 70 30 30 | 71            | 39.5         | 968    | gn. m               | Do.                   |
| 2217                        | Aug. 23  | 39 47 20  | 69 34 15 | 73            | 38.1         | 924    | gy. m               | Do.                   |
| 2218                        | Aug. 23  | 39 46 22  | 69 29 00 | 74            | 38.8         | 948    | gy. m               |                       |
| 2219                        | Aug. 23  | 39 46 22  | 69 29 00 | 74            | 38.8         | 948    | gy. m               |                       |
| 2220                        | Aug. 23  | 39 43 30  | 69 23 00 | 74            | 38.3         | 1,054  | gy. m               |                       |
| 2221                        | Sept. 6  | 39 05 30  | 70 44 30 | 75            | 36.9         | 1,525  | gy. oz              |                       |
| 2222                        | Sept. 6  | 39 03 15  | 70 50 45 | 73            | 36.9         | 1,537  | gy. oz              |                       |
| 2223                        | Sept. 7  | 37 48 30  | 69 43 30 | 75            | 36.4         | 2,516  | glob. oz            |                       |
| 2224                        | Sept. 8  | 36 16 30  | 68 21 00 | 79            | 36.8         | 2,574  | glob. oz            |                       |
| 2225                        | Sept. 9  | 36 05 30  | 69 51 45 | 78            | 36.7         | 2,512  | yl. oz.             |                       |
| 2226                        | Sept. 10 | 37 00 00  | 71 54 00 | 80            | 36.8         | 2,045  | glob. oz            |                       |
| 2227                        | Sept. 10 | 36 55 23  | 71 55 00 | 82            | 36.8         | 2,109  | glob. oz            | Lost trawl.           |
| 2228                        | Sept. 11 | 37 25 00  | 73 06 00 | 77            | 36.8         | 1,582  | br. m.              | L. B. T.              |
| 2229                        | Sept. 11 | 37 38 40  | 73 16 30 | 75            | 37.7         | 1,423  | glob. oz            | Do.                   |
| 2230                        | Sept. 12 | 38 27 00  | 73 02 00 | 75            | 36.8         | 1,168  | gy. oz              | Do.                   |
| 2231                        | Sept. 12 | 38 29 00  | 73 09 00 | 75            | 36.8         | 965    | gy. oz              | Do.                   |
| 2232                        | Sept. 12 | 38 37 30  | 73 11 00 | 74            | 42.8         | 243    | gn. m               | Do.                   |
| 2233                        | Sept. 12 | 38 36 30  | 73 06 00 | 73            | 39.2         | 630    | gn. m               | Do.                   |
| 2234                        | Sept. 13 | 39 09 00  | 72 03 15 | 69            | 38.6         | 810    | gn. m               | Do.                   |
| 2235                        | Sept. 13 | 39 12 00  | 72 03 30 | 72            | 38.8         | 707    | gn. m               | Do.                   |
| 2236                        | Sept. 13 | 39 11 00  | 72 03 30 | 72            | 39.5         | 636    | gn. m               | Do.                   |
| 2237                        | Sept. 13 | 39 12 17  | 72 09 30 | 72            | 39.5         | 520    | gn. m               | Do.                   |
| 2238                        | Sept. 13 | 39 06 00  | 72 10 00 | 72            | 38.7         | 904    | gy. m               | Do.                   |
| 2239                        | Sept. 26 | 40 38 00  | 70 29 45 | 62            |              | 32     | gn. m               | Do.                   |
| 2240                        | Sept. 26 | 40 27 30  | 70 29 00 | 61            |              | 44     | gn. m               | Do.                   |
| 2241                        | Sept. 26 | 40 21 00  | 70 29 15 | 63            | 51.4         | 50     | gn. m               | Do.                   |
| 2242                        | Sept. 26 | 40 15 30  | 70 27 00 | 63            | 51.4         | 58     | gn. m               | Do.                   |
| 2243                        | Sept. 26 | 40 10 15  | 70 26 00 | 64            | 52.4         | 63     | gn. m               | Do.                   |
| 2244                        | Sept. 26 | 40 05 15  | 70 23 00 | 71            | 52.9         | 67     | gn. m. s.           | Do.                   |
| 2245                        | Sept. 26 | 40 01 15  | 70 22 00 | 61            | 50.9         | 98     | gn. m. bk. s.       | Do.                   |
| 2246                        | Sept. 26 | 39 56 45  | 70 20 30 | 71            | 48.8         | 122    | gn. m               | Do.                   |
| 2247                        | Sept. 27 | 40 03 00  | 69 57 00 | 70            | 51.9         | 78     | gn. m. s.           | Do.                   |
| 2248                        | Sept. 27 | 40 07 00  | 69 57 00 | 70            | 52.4         | 67     | gn. m. bk. s.       | Do.                   |
| 2249                        | Sept. 27 | 40 11 00  | 69 52 00 | 70            | 51.4         | 53     | gn. m. fne. s.      | Do.                   |
| 2250                        | Sept. 27 | 40 17 15  | 69 51 45 | 68            | 51.4         | 47     | gn. m. fne. s.      | Do.                   |
| 2251                        | Sept. 27 | 40 22 17  | 69 51 30 | 65            | 50.9         | 43     | gn. m. fne. s.      | Do.                   |
| 2252                        | Sept. 27 | 40 28 00  | 69 51 00 | 63            | 50.3         | 38     | gn. m. fne. s.      | Do.                   |
| 2253                        | Sept. 27 | 40 34 30  | 69 50 45 | 61            | 52.9         | 32     | gy. s. bk. sp.      | Do.                   |
| 2254                        | Sept. 27 | 40 40 30  | 69 50 30 | 61            | 54.4         | 25     | gy. s. bk. sp.      | Do.                   |
| 2255                        | Sept. 27 | 40 46 30  | 69 50 15 | 60            | 55.9         | 18     | fne. s. bk. sp.     | Do.                   |
| 2256                        | Sept. 28 | 40 38 30  | 69 29 00 | 61            | 52.9         | 30     | yl. s.              | Do.                   |
| 2257                        | Sept. 28 | 40 32 30  | 69 29 00 | 61            | 51.9         | 33     | yl. s. bk. sp.      | Do.                   |
| 2258                        | Sept. 28 | 40 26 00  | 69 29 00 | 61            | 51.2         | 36     | gy. s. bk. sp.      | Do.                   |
| 2259                        | Sept. 28 | 40 19 30  | 69 29 10 | 61            | 50.2         | 41     | gy. s. bk. sp.      | Do.                   |
| 2260                        | Sept. 28 | 40 13 15  | 69 29 15 | 65            | 50.2         | 46     | gy. s.              | Do.                   |
| 2261                        | Sept. 28 | 40 04 00  | 69 29 30 | 66            | 53.9         | 58     | gy. s. bk. sp.      | Do.                   |
| 2262                        | Sept. 28 | 39 54 45  | 69 29 45 | 67            | 41.6         | 250    | gn. m. s.           | Do.                   |
| 2263                        | Oct. 18  | 37 08 00  | 74 33 00 | 68            |              | 430    | gn. m               | Do.                   |
| 2264                        | Oct. 18  | 37 07 50  | 74 34 20 | 66            | 46.8         | 167    | gy. s.              | Do.                   |
| 2265                        | Oct. 18  | 37 07 40  | 74 35 40 | 67            | 57.9         | 70     | gn. m. g.           | Do.                   |
| 2266                        | Oct. 19  | 35 07 00  | 75 08 30 | 73            | 62.8         | 111    | fne. s. bk. sp.     | S. B. T.              |
| 2267                        | Oct. 19  | 35 08 50  | 75 07 20 | 79            | 72.8         | 68     | gy. m               | Tgl. bar.             |
| 2268                        | Oct. 19  | 35 10 40  | 75 06 10 | 79            | 71.3         | 68     | gy. m               | Do.                   |
| 2269                        | Oct. 19  | 35 12 30  | 75 05 00 | 75            | 77           | 48     | crs. gy. bk. s.     | Do.                   |
| 2270                        | Oct. 19  | 35 14 15  | 75 07 00 | 75            | 76.3         | 32     | fne. gy. s. bk. sp. | D. S. dredge.         |
| 2271                        | Oct. 19  | 35 16 00  | 75 09 00 | 75            |              | 26     | crs. gy. s. bk. sp. | S. B. T.              |
| 2272                        | Oct. 19  | 35 20 10  | 75 14 00 | 75            |              | 15     | gy. s. bk. sp.      | Do.                   |
| 2273                        | Oct. 19  | 35 20 30  | 75 17 30 | 72            | 72.3         | 17     | gy. s. brk. sh.     | Do.                   |
| 2274                        | Oct. 19  | 35 20 35  | 75 18 05 | 71            |              | 16     | gy. s. brk. sh.     | Dr. S. dredge.        |
| 2275                        | Oct. 19  | 35 20 40  | 75 18 40 | 71            |              | 16     | gy. s. brk. sh.     | Dr. & M. B.           |
| 2276                        | Oct. 19  | 35 20 45  | 75 19 15 | 71            |              | 16     | gy. s. brk. sh.     | Do.                   |
| 2277                        | Oct. 19  | 35 20 50  | 75 19 50 | 71            |              | 16     | gy. s. brk. sh.     | Do.                   |
| 2278                        | Oct. 19  | 35 20 55  | 75 20 20 | 71            |              | 16     | gy. s. brk. sh.     | L. B. T.              |
| 2279                        | Oct. 19  | 35 20 55  | 75 20 55 | 71            |              | 16     | gy. s. brk. sh.     | Do.                   |
| 2280                        | Oct. 19  | 35 21 00  | 75 21 30 | 70            |              | 16     | gy. s. brk. sh.     | Do.                   |
| 2281                        | Oct. 19  | 35 21 05  | 75 22 05 | 70            |              | 16     | gy. s. brk. sh.     | Do.                   |
| 2282                        | Oct. 19  | 35 21 10  | 75 22 40 | 70            |              | 14     | bk. s.              | Do.                   |
| 2283                        | Oct. 19  | 35 21 15  | 75 23 15 | 70            |              | 14     | gy. s.              | Do.                   |
| 2284                        | Oct. 19  | 35 21 20  | 75 23 50 | 70            |              | 13     | crs. gy. s.         | Do.                   |
| 2285                        | Oct. 19  | 35 21 25  | 75 24 25 | 70            |              | 13     | crs. gy. s.         | Do.                   |
| 2286                        | Oct. 19  | 35 21 30  | 75 25 00 | 70            |              | 11     | crs. gy. s.         | Do.                   |
| 2287                        | Oct. 20  | 35 22 30  | 75 26 00 | 69            |              | 7      | crs. gy. s.         | Do.                   |
| 2288                        | Oct. 20  | 35 22 40  | 75 26 30 | 69            |              | 7      | crs. s. brk. sh.    | Do.                   |
| 2289                        | Oct. 20  | 35 22 50  | 75 25 00 | 69            |              | 7      | crs. s. bk. sp.     | Do.                   |
| 2290                        | Oct. 20  | 35 23 00  | 75 24 30 | 69            |              | 9      | s. brk. sh.         | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                  | Date.   | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.          | Instrument used, etc. |
|-----------------------------|---------|-----------|----------|---------------|--------------|--------|--------------------------|-----------------------|
|                             |         | Lat. N.   | Long. W. |               |              |        |                          |                       |
| Cape Hatteras to Nantucket. |         |           |          |               |              |        |                          |                       |
| 1884.                       |         |           |          |               |              |        |                          |                       |
| 2291                        | Oct. 20 | 35 25 30  | 75 20 30 | 69            |              | 15     | gy. s. brk. sh.          | L. B. T.              |
| 2292                        | Oct. 20 | 35 27 20  | 75 16 30 | 70            |              | 17     | gy. s. brk. sh.          | Do.                   |
| 2293                        | Oct. 20 | 35 29 10  | 75 12 30 | 71            |              | 18     | crs. s. bk. sp.          | Do.                   |
| 2294                        | Oct. 20 | 35 31 00  | 75 08 30 | 71            |              | 19     | crs. gy. s.              | Do.                   |
| 2295                        | Oct. 20 | 35 32 41  | 75 04 30 | 73            |              | 22     | crs. gy. s.              | Do.                   |
| 2296                        | Oct. 20 | 35 35 20  | 74 58 45 | 71            |              | 27     | crs. gy. s.              | Do.                   |
| 2297                        | Oct. 20 | 35 38 00  | 74 53 00 | 73            |              | 49     | bk. m. brk. sh.          | Do.                   |
| 2298                        | Oct. 20 | 35 39 00  | 74 52 00 | 73            |              | 80     | bk. m. brk. sh.          | Do.                   |
| 2299                        | Oct. 20 | 35 40 00  | 74 51 30 | 73            |              | 296    | bk. m.                   | Do.                   |
| 2300                        | Oct. 20 | 35 41 30  | 74 48 30 | 71            |              | 671    | bk. m.                   | Do.                   |
| 2301                        | Oct. 21 | 35 11 30  | 75 05 00 | 77            | 75           | 59     | crs. s. bk. sp.          | Tgl. bar.             |
| 2302                        | Oct. 21 | 35 14 00  | 75 03 00 | 77            | 71.4         | 49     | s. co.                   | Do.                   |
| 2303                        | Oct. 21 | 35 17 00  | 75 01 00 | 77            |              | 41     | fne. gy. and bk. s.      | S. B. T.              |
| 2304                        | Oct. 21 | 35 19 00  | 74 58 00 | 77            |              | 37     | fne. gy. and bk. s.      | Do.                   |
| 2305                        | Oct. 21 | 35 23 00  | 74 51 30 | 79            | 66.2         | 58     | fne. gy. and bk. s.      | Do.                   |
| 2306                        | Oct. 21 | 35 21 30  | 74 52 00 | 79            | 41.7         | 322    | gy. m.                   | L. B. T.              |
| 2307                        | Oct. 21 | 35 42 00  | 74 54 30 | 70            | 57.3         | 43     | gy. and bk. s.           | Do.                   |
| 2308                        | Oct. 21 | 35 43 00  | 74 53 30 | 71            |              | 45     | gy. and bk. s.           | Do.                   |
| 2309                        | Oct. 21 | 35 43 30  | 74 52 00 | 71            |              | 56     | gy. s. brk. sh.          | Do.                   |
| 2310                        | Oct. 21 | 35 44 00  | 74 51 00 | 71            |              | 132    | bk. m. fne. s.           | Do.                   |
| Charleston to Savannah.     |         |           |          |               |              |        |                          |                       |
| 1885.                       |         |           |          |               |              |        |                          |                       |
| 2311                        | Jan. 5  | 32 55 00  | 77 54 00 | 72            | 59.1         | 79     | crs. s. bk. sp.          | L. B. T.              |
| 2312                        | Jan. 5  | 32 54 00  | 77 53 30 | 73            | 57.8         | 88     | crs. s. bk. sp.          | Do.                   |
| 2313                        | Jan. 5  | 32 53 00  | 77 53 00 | 73            | 57.2         | 99     | crs. s. bk. sp. brk. sh. | Do.                   |
| 2314                        | Jan. 5  | 32 43 00  | 77 51 00 | 69            | 47.4         | 159    | crs. s. bk. sp. brk. sh. | Do.                   |
| Havana, Cuba, to Yucatan.   |         |           |          |               |              |        |                          |                       |
| 2315                        | Jan. 15 | 24 26 00  | 81 48 15 | 75            |              | 37     | co.                      | L. B. T.              |
| 2316                        | Jan. 15 | 24 25 30  | 81 47 45 | 75            | 74           | 50     |                          | Do.                   |
| 2317                        | Jan. 15 | 24 25 45  | 81 46 45 | 75            | 75           | 45     | co.                      | Do.                   |
| 2318                        | Jan. 15 | 24 25 45  | 81 46 00 | 75            | 75           | 45     | co.                      | Do.                   |
| 2319                        | Jan. 17 | 23 10 37  | 82 20 06 | 76            |              | 143    | gy. co.                  | Tgls.                 |
| 2320                        | Jan. 17 | 23 10 39  | 82 18 48 | 76            |              | 130    | fne. co.                 | Do.                   |
| 2321                        | Jan. 17 | 23 10 54  | 82 18 00 | 77            |              | 230    | fne. gy. s.              | Do.                   |
| 2322                        | Jan. 17 | 23 10 54  | 82 17 45 | 77            |              | 115    | co.                      | Do.                   |
| 2323                        | Jan. 17 | 23 10 51  | 82 19 03 | 78            |              | 163    | wh. br. co.              | Do.                   |
| 2324                        | Jan. 17 | 23 10 25  | 82 20 24 | 78            | 79.1         | 33     | co.                      | Do.                   |
| 2325                        | Jan. 17 | 23 10 48  | 82 19 54 | 78            |              | 170    | lt. br. co.              | Do.                   |
| 2326                        | Jan. 17 | 23 11 45  | 82 18 54 | 78            | 62           | 194    | br. co.                  | Do.                   |
| 2327                        | Jan. 17 | 23 11 45  | 82 17 54 | 76            |              | 182    | fne. br. s.              | Do.                   |
| 2328                        | Jan. 17 | 23 11 03  | 82 19 15 | 75            | 58           | 203    | fne. gy. co.             | Do.                   |
| 2329                        | Jan. 17 | 23 11 03  | 82 18 45 | 75            |              | 118    | wh. co.                  | Do.                   |
| 2330                        | Jan. 17 | 23 10 48  | 82 19 15 | 75            |              | 121    | fne. gy. co.             | Do.                   |
| 2331                        | Jan. 17 | 23 10 31  | 82 19 55 | 75            |              | 114    | co.                      | Do.                   |
| 2332                        | Jan. 19 | 23 10 38  | 82 20 06 | 75            |              | 156    | wh. gy. co.              | Do.                   |
| 2333                        | Jan. 19 | 23 10 36  | 82 19 12 | 75            |              | 169    | fne. wh. co.             | Do.                   |
| 2334                        | Jan. 19 | 23 10 42  | 82 18 24 | 75            |              | 67     | wh. co.                  | Do.                   |
| 2335                        | Jan. 19 | 23 10 39  | 82 20 21 | 77            |              | 204    |                          | Do.                   |
| 2336                        | Jan. 19 | 23 10 48  | 82 18 52 | 77            |              | 157    | co.                      | Do.                   |
| 2337                        | Jan. 19 | 23 10 39  | 82 20 21 | 78            |              | 199    | co.                      | Do.                   |
| 2338                        | Jan. 19 | 23 10 40  | 82 20 15 | 78            |              | 189    | co.                      | Do.                   |
| 2339                        | Jan. 19 | 23 10 40  | 82 20 15 | 78            |              | 191    | co.                      | Do.                   |
| 2340                        | Jan. 19 | 23 10 47  | 82 20 06 | 78            |              | 234    | co.                      | Do.                   |
| 2341                        | Jan. 19 | 23 11 00  | 82 19 06 | 78            |              | 143    | co.                      | Do.                   |
| 2342                        | Jan. 19 | 23 10 39  | 82 20 21 | 78            |              | 201    | co.                      | Do.                   |
| 2343                        | Jan. 19 | 23 11 35  | 82 19 25 | 78            |              | 279    | fne. co.                 | Do.                   |
| 2344                        | Jan. 19 | 23 10 39  | 82 20 21 | 78            |              | 199    | br. co.                  | Do.                   |
| 2345                        | Jan. 20 | 23 10 40  | 82 20 15 | 78            |              | 184    | fne. gy. wh. co.         | Do.                   |
| 2346                        | Jan. 20 | 23 10 39  | 82 20 21 | 78            |              | 200    | co.                      | Do.                   |
| 2347                        | Jan. 20 | 23 10 39  | 82 20 21 | 78            |              | 216    | co.                      | Do.                   |
| 2348                        | Jan. 20 | 23 10 39  | 82 20 21 | 78            |              | 211    | co.                      | Do.                   |
| 2349                        | Jan. 20 | 23 10 40  | 82 20 15 | 78            |              | 182    | co.                      | Do.                   |
| 2350                        | Jan. 20 | 23 10 39  | 82 20 21 | 78            |              | 213    | co.                      | S. B. T.              |
| 2351                        | Jan. 21 | 22 41 00  | 84 16 30 | 77            |              | 426    |                          | L. B. T.              |
| 2352                        | Jan. 21 | 22 35 00  | 84 23 00 | 77            | 45           | 463    | wh. co.                  | Do.                   |
| 2353                        | Jan. 22 | 20 59 00  | 86 23 00 | 79            | 62.8         | 167    | co.                      | Tgls.                 |
| 2354                        | Jan. 22 | 20 59 30  | 86 23 45 | 78            |              | 130    | co.                      | S. B. T.              |
| 2355                        | Jan. 22 | 20 58 48  | 86 27 00 | 78            |              | 399    | yl. oz.                  | Do.                   |
| 2356                        | Jan. 29 | 20 18 50  | 87 08 00 | 78            |              | 137    | fne. wh. co.             | Tgls.                 |
| 2357                        | Jan. 29 | 20 19 00  | 87 03 10 | 78            |              | 178    | wh. co.                  | Do.                   |
| 2358                        | Jan. 29 | 20 19 00  | 87 03 30 | 78            |              | 222    | fne. wh. co.             | S. B. T.              |
| 2359                        | Jan. 29 | 20 19 10  | 87 03 30 | 78            | 50.8         | 231    | wh. co.                  | Do.                   |
| 2360                        | Jan. 30 | 22 08 30  | 86 49 00 | 78            |              | 26     | wh. co.                  | Tgls.                 |
| 2361                        | Jan. 30 | 22 08 15  | 86 51 15 | 78            |              | 25     | co. s.                   | S. B. T.              |
| 2362                        | Jan. 30 | 22 08 30  | 86 53 30 | 78            |              | 25     | co. s.                   | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                | Date.   | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.              | Instrument used, etc. |
|---------------------------|---------|-----------|----------|---------------|--------------|--------|------------------------------|-----------------------|
|                           |         | Lat. N.   | Long. W. |               |              |        |                              |                       |
| Havana, Cuba, to Yucatan. |         |           |          |               |              |        |                              |                       |
| 1885.                     |         |           |          |               |              |        |                              |                       |
| 2363                      | Jan. 30 | 22 07 30  | 87 06 00 | 77            |              | 21     | wh r. co                     | S. B. T.              |
| 2364                      | Jan. 30 | 22 08 40  | 87 06 00 | 77            |              | 22     | co. s.                       | Do.                   |
| 2365                      | Jan. 30 | 22 18 00  | 87 04 00 | 77            |              | 24     | wh. r. co                    | Do.                   |
| 2366                      | Jan. 30 | 22 28 00  | 87 02 00 | 76            |              | 27     | fne. wh. co.                 | Do.                   |
| 2367                      | Jan. 30 | 22 38 00  | 87 00 00 | 76            |              | 124    | wh. co                       | Do.                   |
| Gulf of Mexico.           |         |           |          |               |              |        |                              |                       |
| 2368                      | Feb. 7  | 29 15 00  | 85 32 00 | 64            |              | 28     | crs. gy. s. brk. sh.         | Tgls.                 |
| 2369                      | Feb. 7  | 29 16 30  | 85 32 00 | 64            |              | 26     | crs. gy. s. brk. sh.         | L. B. T.              |
| 2370                      | Feb. 7  | 29 18 15  | 85 32 00 | 64            |              | 25     | crs. gy. s. brk. sh.         | Do.                   |
| 2371                      | Feb. 7  | 29 17 00  | 85 30 45 | 66            |              | 26     | gy. s. brk. sh.              | Do.                   |
| 2372                      | Feb. 7  | 29 15 30  | 85 29 30 | 64            |              | 27     | g.                           | Do.                   |
| 2373                      | Feb. 7  | 29 14 00  | 85 29 15 | 64            |              | 25     | co.                          | Do.                   |
| 2374                      | Feb. 7  | 29 11 30  | 85 29 00 | 65            |              | 26     | s. g. brk. sh.               | Do.                   |
| 2375                      | Feb. 7  | 29 10 00  | 85 31 00 | 65            |              | 30     | s. bk. sp. brk. sh.          | Do.                   |
| 2376                      | Feb. 11 | 29 03 15  | 88 16 00 | 62            | 46.5         | 324    | gy. m.                       | Do.                   |
| 2377                      | Feb. 11 | 29 07 30  | 88 08 00 | 63            | 67           | 210    | gy. m.                       | Do.                   |
| 2378                      | Feb. 11 | 29 14 30  | 88 09 30 | 63            |              | 68     | gy. m.                       | Do.                   |
| 2379                      | Mar. 2  | 28 00 15  | 87 42 00 | 66            |              | 1,467  | yl. oz.                      | Do.                   |
| 2380                      | Mar. 2  | 28 02 30  | 87 43 45 | 69            | 40.1         | 1,430  | br. m.                       | Do.                   |
| 2381                      | Mar. 2  | 28 05 00  | 87 56 15 | 69            |              | 1,330  | lt. br. m.                   | Do.                   |
| 2382                      | Mar. 3  | 28 19 45  | 88 01 30 | 62            | 39.6         | 1,255  | gy. m.                       | Do.                   |
| 2383                      | Mar. 3  | 28 32 00  | 88 06 00 | 69            | 39.8         | 1,181  | br. gn. m.                   | Do.                   |
| 2384                      | Mar. 3  | 28 45 00  | 88 15 30 | 67            | 39.6         | 940    | br. gy. m.                   | Do.                   |
| 2385                      | Mar. 3  | 28 51 00  | 88 18 00 | 67            | 40.1         | 730    | gy. m.                       | Do.                   |
| 2386                      | Mar. 4  | 29 15 00  | 88 06 00 | 67            | 61.8         | 60     | bu. m.                       | Do.                   |
| 2387                      | Mar. 4  | 29 24 00  | 88 04 00 | 61            |              | 32     | s. g. brk. sh.               | Do.                   |
| 2388                      | Mar. 4  | 29 24 30  | 88 01 00 | 61            |              | 35     | yl. s. bk. sp.               | Do.                   |
| 2389                      | Mar. 4  | 29 28 00  | 87 56 00 | 62            |              | 27     | gy. s. brk. sh.              | Do.                   |
| 2390                      | Mar. 4  | 29 27 30  | 87 48 30 | 62            |              | 30     | crs. s. bk. sp. sh.          | Do.                   |
| 2391                      | Mar. 4  | 29 32 00  | 87 45 00 | 59            |              | 25     | gy. s. bk. sp.               | Do.                   |
| 2392                      | Mar. 13 | 28 47 30  | 87 27 00 | 62            | 40.7         | 724    | br. gy. m.                   | Do.                   |
| 2393                      | Mar. 13 | 28 43 00  | 87 14 30 | 64            | 41.1         | 525    | lt. gy. m.                   | Do.                   |
| 2394                      | Mar. 13 | 28 38 30  | 87 02 00 | 66            | 41.8         | 420    | gn. m.                       | Do.                   |
| 2395                      | Mar. 13 | 28 36 15  | 86 50 00 | 66            | 44.1         | 347    | gy. m.                       | Do.                   |
| 2396                      | Mar. 13 | 28 34 00  | 86 48 00 | 66            |              | 335    | gy. m.                       | Do.                   |
| 2397                      | Mar. 14 | 28 42 00  | 86 36 00 | 65            | 46.1         | 280    | gy. m.                       | Do.                   |
| 2398                      | Mar. 14 | 28 45 00  | 86 26 00 | 67            | 48.6         | 227    | gy. m.                       | Do.                   |
| 2399                      | Mar. 14 | 28 44 00  | 86 18 00 | 68            | 51.6         | 196    | gy. m.                       | Do.                   |
| 2400                      | Mar. 14 | 28 41 00  | 86 07 00 | 67            |              | 169    | gy. m.                       | Do.                   |
| 2401                      | Mar. 14 | 28 38 30  | 85 52 30 | 69            |              | 142    | gn. m. brk. sh.              | Do.                   |
| 2402                      | Mar. 14 | 28 36 00  | 85 33 30 | 63            |              | 111    | gy. m.                       | Do.                   |
| 2403                      | Mar. 15 | 28 42 30  | 85 29 00 | 65            |              | 88     | gy. m.                       | Do.                   |
| 2404                      | Mar. 15 | 28 44 00  | 85 16 00 | 66            |              | 60     | gy. s.                       | Do.                   |
| 2405                      | Mar. 15 | 28 45 00  | 85 02 00 | 68            |              | 30     | gy. s. brk. co.              | Do.                   |
| 2406                      | Mar. 15 | 28 46 00  | 84 49 00 | 64            |              | 26     | crs. s. co.                  | Do.                   |
| 2407                      | Mar. 15 | 28 47 30  | 84 37 00 | 63            |              | 24     | co. brk. sh.                 | Do.                   |
| 2408                      | Mar. 16 | 28 28 00  | 84 25 00 | 64            |              | 21     | co.                          | Do.                   |
| 2409                      | Mar. 18 | 27 04 00  | 83 21 15 | 66            |              | 28     | crs. gy. s. brk. sh.         | Do.                   |
| 2410                      | Mar. 18 | 26 47 30  | 83 25 15 | 66            |              | 28     | fne. wh. s. bk. sp. brk. sh. | Rake dredge.          |
| 2411                      | Mar. 18 | 26 33 30  | 83 15 30 | 67            |              | 27     | fne. wh. s. bk. sp.          | L. B. T.              |
| 2412                      | Mar. 19 | 26 18 30  | 83 08 45 | 66            |              | 27     | fne. gy. s. bk. sp. brk. sh. | Do.                   |
| 2413                      | Mar. 19 | 26 00 00  | 82 57 30 | 66            |              | 24     | fne. s. bk. sp. brk. sh.     | Do.                   |
| 2414                      | Mar. 19 | 25 04 30  | 82 59 15 | 69            |              | 26     | fne. wh. s. brk. sh.         | Do.                   |
| Savannah to Cape Charles. |         |           |          |               |              |        |                              |                       |
| 2415                      | Apr. 1  | 30 44 00  | 79 26 00 | 70            | 45.6         | 440    | co. crs. s. sh. for.         | L. B. T.              |
| 2416                      | Apr. 1  | 31 26 00  | 79 07 00 | 74            | 53.8         | 276    | co. brk. sh.                 | Do.                   |
| 2417                      | Apr. 2  | 33 18 30  | 77 07 00 | 67            | 65.8         | 95     | fne. gy. s.                  | Do.                   |
| 2418                      | Apr. 2  | 33 20 00  | 77 05 00 | 67            | 65.8         | 90     | gy. s.                       | Do.                   |
| 2419                      | Apr. 2  | 33 34 00  | 76 40 30 | 72            | 60.3         | 107    | fne. gy. s. bk. sp.          | Do.                   |
| 2420                      | Apr. 5  | 37 03 20  | 74 31 40 | 48            | 47.7         | 104    | bk. s. m. g.                 | Do.                   |
| 2421                      | June 3  | 37 07 00  | 74 34 30 | 61            |              | 64     | fne. gy. s. p.               | Do.                   |
| 2422                      | June 3  | 37 08 30  | 74 33 30 | 63            | 52.5         | 85     | crs. gy. s. bk. sp.          | Do.                   |
| brk. sh.                  |         |           |          |               |              |        |                              |                       |
| 2423                      | June 3  | 37 10 15  | 74 32 00 | 67            |              | 143    | gn. m. fne. s.               | Do.                   |
| 2424                      | June 4  | 36 41 37  | 74 42 15 | 67            | 52.5         | 85     | bk. m.                       | Do.                   |
| 2425                      | June 4  | 36 20 24  | 74 46 30 | 69            | 51.5         | 119    | dk. gy. m. fne. s.           | Do.                   |
| 2426                      | June 4  | 36 01 30  | 74 47 30 | 71            | 52.0         | 93     | crs. gy. bk. s. brk. sh.     | Do.                   |
| Off Newfoundland.         |         |           |          |               |              |        |                              |                       |
| 2427                      | June 23 | 42 46 00  | 51 00 00 | 47            | 38.7         | 523    | hrd.                         | L. B. T.              |
| 2428                      | June 23 | 42 48 00  | 50 55 30 | 48            | 38.3         | 826    | gn. m.                       | Do.                   |
| 2429                      | June 23 | 42 55 30  | 50 51 00 | 45            | 38.7         | 471    | gy. m.                       | Do.                   |
| 2430                      | June 23 | 42 58 30  | 50 50 00 | 46            |              | 179    | gn. s. p.                    | Do.                   |
| 2431                      | June 23 | 43 00 00  | 50 47 30 | 46            | 33.5         | 129    | yl. s. bk. sp.               | Do.                   |
| 2432                      | June 23 | 43 04 00  | 50 45 00 | 47            |              | 64     | fne. gy. s.                  | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.        | Date.   | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.              | Instrument used, etc. |
|-------------------|---------|-----------|----------|---------------|--------------|--------|------------------------------|-----------------------|
|                   |         | Lat. N.   | Long. W. |               |              |        |                              |                       |
| Off Newfoundland. |         |           |          |               |              |        |                              |                       |
|                   | 1885.   | ° ' "     | ° ' "    | ° F.          | ° F.         | Fms.   |                              |                       |
| 2433              | June 23 | 43 05 00  | 50 43 00 | 48            | 33           | 57     | gn. s. ....                  | L. B. T.              |
| 2434              | June 23 | 43 08 00  | 50 40 00 | 48            | 34           | 51     | gn. m. ....                  | Do.                   |
| 2435              | June 23 | 43 12 00  | 50 38 45 | 48            | 34           | 47     | bk. m. ....                  | Do.                   |
| 2436              | June 24 | 43 36 00  | 50 06 30 | 49            | 34           | 36     | wh. s. bk. sp. brk. sh. .... | Do.                   |
| 2437              | June 24 | 43 36 00  | 50 05 00 | 49            | 35.8         | 37     | crs. brk. sh. brk. st. ....  | Do.                   |
| 2438              | June 24 | 43 36 00  | 50 03 30 | 48            | 36.8         | 37     | gn. s. bk. sp. brk. sh. .... | Do.                   |
| 2439              | June 24 | 43 37 00  | 49 56 30 | 48            | 37.8         | 36     | wh. s. bk. sp. ....          | Do.                   |
| 2440              | June 24 | 43 38 00  | 49 49 30 | 48            | 38.3         | 33     | fne. wh. s. bk. sp. ....     | Do.                   |
| 2441              | June 25 | 45 27 00  | 49 42 00 | 43            | 33           | 34     | wh. s. brk. sh. ....         | Do.                   |
| 2442              | June 25 | 45 33 00  | 49 43 00 | 44            | 33.2         | 36     | wh. s. brk. sh. ....         | Do.                   |
| 2443              | June 25 | 45 44 00  | 49 45 00 | 46            | 34.9         | 35     | wh. s. brk. sh. ....         | Do.                   |
| 2444              | June 25 | 45 59 00  | 49 45 30 | 45            | 34.4         | 39     | wh. s. brk. sh. ....         | Do.                   |
| 2445              | June 25 | 46 09 30  | 49 48 30 | 44            | 33.5         | 39     | brk. sh. ....                | Do.                   |
| 2446              | June 25 | 46 20 00  | 49 52 00 | 43            | 35.3         | 40     | brk. sh. ....                | Do.                   |
| 2447              | June 25 | 46 26 00  | 49 42 00 | 43            | 34.8         | 39     | brk. sh. ....                | Do.                   |
| 2448              | June 25 | 46 28 00  | 49 39 30 | 43            | 33.9         | 40     | s. g. ....                   | Do.                   |
| 2449              | June 25 | 46 37 00  | 49 50 30 | 42            | 33           | 39     | brk. sh. ....                | Do.                   |
| 2450              | June 25 | 46 45 00  | 50 02 30 | 42            | 31           | 44     | p. brk. sh. ....             | Do.                   |
| 2451              | June 26 | 46 58 00  | 50 34 00 | 40            | 29.7         | 67     | s. sh. ....                  | S. B. T.              |
| 2452              | June 26 | 47 04 00  | 50 48 00 | 40            | 29.7         | 89     | fne. gn. s. ....             | L. B. T.              |
| 2453              | June 26 | 47 10 00  | 51 02 00 | 41            | 29.7         | 82     | gn. m. fne. s. ....          | Do.                   |
| 2454              | June 26 | 47 16 00  | 51 16 00 | 42            | 29.7         | 74     | fne. gy. s. ....             | Do.                   |
| 2455              | June 26 | 47 21 00  | 51 38 30 | 43            | 30           | 81     | br. s. ....                  | Do.                   |
| 2456              | July 2  | 47 29 00  | 52 18 00 | 46            | ---          | 86     | g. ....                      | Bl. Dr.               |
| 2457              | July 2  | 47 13 00  | 52 24 00 | 47            | 29.5         | 86     | gy. s. ....                  | Do.                   |
| 2458              | July 2  | 46 48 30  | 52 34 00 | 48            | 29.5         | 89     | s. gn. m. ....               | Do.                   |
| 2459              | July 2  | 46 23 00  | 52 45 00 | 49            | 29.5         | 88     | crs. gy. s. ....             | Do.                   |
| 2460              | July 3  | 45 50 00  | 54 06 00 | 47            | 30           | 67     | gy. s. sh. ....              | Do.                   |
| 2461              | July 3  | 45 47 00  | 54 13 30 | 48            | 30           | 59     | fne. s. bk. sp. ....         | Sh. Dr.               |
| 2462              | July 3  | 45 45 30  | 54 20 30 | 48            | 30           | 41     | wh. s. bk. sp. ....          | Bl. Dr.               |
| 2463              | July 3  | 45 44 00  | 54 27 00 | 50            | 30           | 45     | brk. sh. ....                | Do.                   |
| 2464              | July 3  | 45 40 00  | 54 41 00 | 47            | 32           | 42     | wh. bk. s. brk. sh. ....     | Sh. Dr.               |
| 2465              | July 3  | 45 35 00  | 55 01 00 | 48            | 30           | 67     | bk. gy. s. ....              | Do.                   |
| 2466              | July 3  | 45 29 00  | 55 24 00 | 53            | 30           | 67     | co. ....                     | Do.                   |
| 2467              | July 3  | 45 23 00  | 55 41 00 | 52            | 35.8         | 38     | fne. wh. s. bk. sp. ....     | Bl. Dr.               |
| 2468              | July 3  | 45 11 30  | 55 51 30 | 52            | 33           | 42     | fne. bk. s. ....             | Sh. Dr.               |
| 2469              | July 4  | 44 58 37  | 56 20 45 | 54            | 40.5         | 201    | gn. m. ....                  | L. B. T.              |
| Off Nova Scotia.  |         |           |          |               |              |        |                              |                       |
| 2470              | July 4  | 44 47 00  | 56 33 45 | 54            | 40.2         | 224    | gy. m. ....                  | L. B. T.              |
| 2471              | July 4  | 44 34 00  | 56 41 45 | 53            | 40.4         | 218    | gy. m. s. ....               | Do.                   |
| 2472              | July 4  | 44 27 30  | 57 10 45 | 53            | 40           | 137    | crs. s. g. ....              | Tgls. with grapnels.  |
| 2473              | July 4  | 44 27 15  | 57 10 00 | 53            | 40           | 219    | crs. s. brk. sh. ....        | Do.                   |
| 2474              | July 4  | 44 28 30  | 57 10 45 | 53            | 40           | 133    | hrd. ....                    | Do.                   |
| 2475              | July 4  | 44 28 30  | 57 10 00 | 53            | ---          | 222    | yl. s. p. ....               | Do.                   |
| 2476              | July 4  | 44 28 50  | 57 10 30 | 53            | ---          | 200    | yl. s. p. ....               | Do.                   |
| 2477              | July 4  | 44 29 30  | 57 11 15 | 51            | ---          | 114    | crs. wh. s. p. ....          | L. B. T.              |
| 2478              | July 5  | 44 05 30  | 57 16 30 | 52            | ---          | 191    | fne. yl. s. ....             | Tgls.                 |
| 2479              | July 5  | 44 05 45  | 57 16 45 | 52            | ---          | 129    | wh. s. p. ....               | Do.                   |
| 2480              | July 5  | 44 06 00  | 57 16 30 | 52            | ---          | 189    | wh. s. p. ....               | Sh. Dr.               |
| 2481              | July 5  | 44 07 30  | 57 16 45 | 52            | ---          | 116    | g. ....                      | Do.                   |
| 2482              | July 5  | 44 08 00  | 57 16 15 | 52            | ---          | 265    | br. m. ....                  | Do.                   |
| 2483              | July 5  | 44 16 00  | 57 12 45 | 53            | ---          | 175    | crs. g. ....                 | Do.                   |
| 2484              | July 5  | 44 20 00  | 57 11 15 | 54            | ---          | 204    | fne. wh. s. ....             | Do.                   |
| 2485              | July 5  | 44 24 00  | 57 09 50 | 54            | ---          | 205    | fne. wh. s. ....             | Do.                   |
| 2486              | July 5  | 44 26 00  | 57 11 15 | 54            | 39.7         | 190    | crs. s. g. ....              | Do.                   |
| 2487              | July 5  | 44 28 30  | 57 14 45 | 54            | ---          | 39     | gy. s. g. ....               | Do.                   |
| 2488              | July 5  | 44 35 00  | 57 13 30 | 53            | ---          | 150    | yl. s. ....                  | Do.                   |
| 2489              | July 5  | 44 43 00  | 57 22 45 | 53            | ---          | 33     | wh. s. ....                  | Do.                   |
| 2490              | July 6  | 45 27 30  | 58 27 45 | 52            | ---          | 50     | g. p. ....                   | Do.                   |
| 2491              | July 6  | 45 24 30  | 58 35 15 | 53            | ---          | 59     | wh. s. ....                  | Do.                   |
| 2492              | July 6  | 45 22 00  | 58 43 45 | 53            | 33.3         | 75     | wh. s. ....                  | Do.                   |
| 2493              | July 6  | 45 19 00  | 58 51 15 | 53            | 32.3         | 45     | wh. s. brk. sh. ....         | Do.                   |
| 2494              | July 6  | 45 14 30  | 59 06 45 | 54            | 32.5         | 50     | s. g. ....                   | Tgls.                 |
| 2495              | July 6  | 45 10 00  | 59 23 45 | 54            | 32.5         | 44     | hrd. ....                    | Do.                   |
| 2496              | July 6  | 45 07 30  | 59 27 45 | 56            | 32.2         | 44     | crs. yl. s. p. ....          | Do.                   |
| 2497              | July 6  | 45 04 00  | 59 36 45 | 55            | 33           | 57     | yl. s. brk. sh. hrd. ....    | Sh. Dr.               |
| 2498              | July 6  | 44 54 00  | 59 46 45 | 57            | ---          | 65     | fne. br. s. ....             | L. B. T.              |
| 2499              | July 6  | 44 46 30  | 59 55 45 | 57            | 35.8         | 130    | bk. m. ....                  | Do.                   |
| 2500              | July 7  | 44 28 00  | 60 15 15 | 58            | ---          | 36     | s. g. ....                   | Do.                   |
| 2501              | July 7  | 44 27 00  | 60 20 15 | 58            | 38.7         | 26     | s. g. ....                   | Do.                   |
| 2502              | July 7  | 44 19 00  | 60 39 15 | 57            | 34.8         | 54     | yl. s. ....                  | Do.                   |
| 2503              | July 7  | 44 22 30  | 61 00 15 | 60            | 35           | 47     | p. ....                      | Do.                   |
| 2504              | July 7  | 44 23 00  | 61 22 45 | 62            | 40.6         | 82     | bk. m. g. ....               | Sh. Dr.               |
| 2505              | July 7  | 44 23 30  | 61 44 15 | 63            | 42.3         | 93     | dk. br. m. ....              | L. B. T.              |
| 2506              | July 8  | 44 26 00  | 62 10 00 | 61            | 43.1         | 127    | dk. br. m. ....              | Do.                   |
| 2507              | July 8  | 44 27 30  | 62 33 30 | 61            | 41.6         | 80     | hrd. ....                    | Sh. Dr.               |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.              | Date.   | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc. |
|-------------------------|---------|-----------|----------|---------------|--------------|--------|---------------------|-----------------------|
|                         |         | Lat. N.   | Long. W. |               |              |        |                     |                       |
| Off Nova Scotia.        |         |           |          |               |              |        |                     |                       |
| 1885.                   |         |           |          |               |              |        |                     |                       |
| 2508                    | July 8  | 44 28 30  | 62 56 00 | 61            | 39.7         | 72     | br m                | L. B. T.              |
| 2509                    | July 8  | 44 30 00  | 63 18 00 | 61            | 34.8         | 43     | crs. s              | Sh. Dr.               |
| 2510                    | July 11 | 44 16 00  | 63 23 00 | 53            | 39.2         | 68     | bk. m. brk. sh      | Dredge.               |
| 2511                    | July 11 | 44 05 30  | 63 31 30 | 57            | 41.6         | 84     | br. m               | Sh. Dr.               |
| 2512                    | July 11 | 43 48 00  | 63 46 30 | 58            | 42.6         | 103    | br. m               | Do.                   |
| 2513                    | July 11 | 43 34 00  | 63 56 30 | 58            | 43.6         | 134    | gv. oz              | S. B. T.              |
| 2514                    | July 11 | 43 28 30  | 63 57 30 | 59            | 43.1         | 126    | bk. m               | Do.                   |
| 2515                    | July 12 | 43 18 30  | 63 51 30 | 58            | 36.3         | 57     | s. g                | Sh. Dr.               |
| 2516                    | July 12 | 43 15 00  | 63 58 00 | 58            | 36.3         | 52     | rky                 | Do.                   |
| 2517                    | July 12 | 43 10 00  | 64 18 00 | 60            | 38.3         | 55     | yl. s. bk. sp       | Do.                   |
| 2518                    | July 12 | 43 05 00  | 64 40 30 | 59            | 38.7         | 60     | st                  | Do.                   |
| 2519                    | July 12 | 42 51 15  | 64 49 00 | 60            | 39.2         | 53     | hrd                 | Do.                   |
| 2520                    | July 12 | 42 41 00  | 64 55 30 | 60            | 40.6         | 62     | rky                 | Do.                   |
| 2521                    | July 12 | 42 30 30  | 65 02 00 | 62            | 42.1         | 65     | s. g                | Do.                   |
| 2522                    | July 12 | 42 20 00  | 65 07 30 | 61            | 46.7         | 104    | s. g                | S. B. T.              |
| Cape Sable to Cape May. |         |           |          |               |              |        |                     |                       |
| 2523                    | July 13 | 41 48 30  | 65 44 30 | 60            | 41.6         | 111    | s. g. st            | Sh. Dr.               |
| 2524                    | July 13 | 41 48 45  | 65 47 00 | 60            | 42.6         | 85     | s. g. st            | Do.                   |
| 2525                    | July 13 | 41 49 00  | 65 49 30 | 60            | 43.6         | 72     | s. g. brk. sh       | Do.                   |
| 2526                    | July 13 | 41 40 45  | 65 46 00 | 66            |              | 121    | p                   | Do.                   |
| 2527                    | July 13 | 41 59 00  | 65 35 30 | 61            |              | 117    | s. g                | (a)                   |
| 2528                    | July 13 | 41 47 00  | 65 37 30 | 69            | 38.7         | 677    | br. s               | L. B. T.              |
| 2529                    | July 14 | 41 03 30  | 66 14 00 | 65            | 38.7         | 662    | gy. m               | Do.                   |
| 2530                    | July 14 | 40 53 30  | 66 24 00 | 67            | 38.4         | 956    | gy. oz              | Do.                   |
| 2531                    | July 14 | 40 42 00  | 66 33 00 | 67            | 38.4         | 852    | gy. m               | Do.                   |
| 2532                    | July 14 | 40 34 30  | 66 48 00 | 67            | 38.7         | 705    | gy. m               | Do.                   |
| 2533                    | July 15 | 40 16 30  | 67 26 15 | 68            | 38.7         | 828    | br. oz              | Do.                   |
| 2534                    | July 15 | 40 01 00  | 67 29 15 | 70            | 37.8         | 1,234  | gy. oz              | Do.                   |
| 2535                    | July 15 | 40 03 30  | 67 27 15 | 70            | 37.8         | 1,149  | gy. oz              | Do.                   |
| 2536                    | Aug. 7  | 39 56 15  | 70 47 30 | 74            |              | 157    | gn. m. fine. s      | Do.                   |
| 2537                    | Aug. 7  | 39 56 45  | 70 50 30 | 74            | 46.2         | 156    | gn. m. fine. s      | Do.                   |
| 2538                    | Aug. 7  | 39 57 30  | 70 51 15 | 74            | 46.2         | 150    | gn. m. fine. s      | Do.                   |
| 2539                    | Aug. 7  | 39 59 45  | 70 53 00 | 74            | 47.7         | 133    | gn. s               | Do.                   |
| 2540                    | Aug. 7  | 39 58 20  | 70 52 00 | 74            | 46.7         | 144    | gn. s               | Do.                   |
| 2541                    | Aug. 7  | 39 57 45  | 70 50 30 | 73            | 47.7         | 134    | gn. s. brk. sh      | Do.                   |
| 2542                    | Aug. 7  | 40 00 15  | 70 42 20 | 76            | 47.2         | 129    | s. brk. sh          | Do.                   |
| 2543                    | Aug. 7  | 39 58 15  | 70 42 30 | 76            | 45.2         | 166    | gn. s. bk. sp       | Do.                   |
| 2544                    | Aug. 8  | 40 01 45  | 70 24 00 | 74            | 47.7         | 131    | gn. s. bk. sp       | Do.                   |
| 2545                    | Aug. 8  | 40 01 00  | 70 23 45 | 74            | 46.7         | 142    | gn. s. bk. sp       | Do.                   |
| 2546                    | Aug. 8  | 39 53 30  | 70 17 30 | 72            | 39.6         | 538    | gn. m               | Do.                   |
| 2547                    | Aug. 8  | 39 54 30  | 70 20 00 | 76            | 39.6         | 390    | gn. m               | Do.                   |
| 2548                    | Aug. 8  | 39 56 00  | 70 14 30 | 76            | 43.4         | 200    | gn. s. bk. sp       | Do.                   |
| 2549                    | Aug. 8  | 39 51 30  | 70 17 00 | 76            | 39.5         | 571    | gn. m               | Do.                   |
| 2550                    | Aug. 9  | 39 44 30  | 70 30 45 | 76            | 38.5         | 1,081  | br. m               | Do.                   |
| 2551                    | Aug. 9  | 39 46 00  | 70 36 30 | 77            | 38.7         | 778    | gy. oz              |                       |
| 2552                    | Aug. 9  | 39 47 07  | 70 35 00 | 77            | 39.6         | 721    | gy. oz              | Do.                   |
| 2553                    | Aug. 9  | 39 48 00  | 70 36 00 | 77            | 39.2         | 551    | gn. m               | Do.                   |
| 2554                    | Aug. 9  | 39 48 30  | 70 40 30 | 77            | 39.6         | 445    | gn. m               | Do.                   |
| 2555                    | Aug. 10 | 39 53 00  | 71 32 00 | 75            | 47.7         | 136    | gn. m. s            | Do.                   |
| 2556                    | Aug. 10 | 39 52 15  | 71 32 00 | 75            |              | 180    | gn. m. fine. s      | S. B. T.              |
| 2557                    | Aug. 10 | 39 53 10  | 71 31 00 | 75            | 46.7         | 154    | gn. m               | Do.                   |
| 2558                    | Aug. 10 | 39 47 15  | 71 50 30 | 76            | 50.3         | 123    | gn. s               | Do.                   |
| 2559                    | Aug. 10 | 39 48 00  | 71 48 30 | 76            |              | 120    | br. m. s            | Do.                   |
| 2560                    | Aug. 10 | 39 48 10  | 71 48 40 | 76            | 50.7         | 114    | br. m. s            | L. B. T.              |
| 2561                    | Aug. 10 | 39 38 00  | 71 42 00 | 77            | 39.2         | 500    | gn. m               | Do.                   |
| 2562                    | Aug. 11 | 39 15 30  | 71 25 00 | 76            | 37.3         | 1,434  | gy. oz              | Do.                   |
| 2563                    | Aug. 11 | 39 18 30  | 71 23 30 | 77            | 37.4         | 1,422  | gv. oz              | Do.                   |
| 2564                    | Aug. 11 | 39 22 00  | 71 23 30 | 78            | 37.3         | 1,390  | gy. oz              | Do.                   |
| 2565                    | Aug. 28 | 38 19 20  | 60 02 30 | 77            | 36.2         | 2,069  | gy. and br. oz      | Do.                   |
| 2566                    | Aug. 29 | 37 23 00  | 68 08 00 | 80            | 36.4         | 2,620  | gy. oz              | Do.                   |
| 2567                    | Aug. 30 | 37 45 00  | 66 56 00 | 78            | 36.4         | 2,721  | gy. oz              | (b)                   |
| 2568                    | Aug. 31 | 39 15 00  | 68 08 00 | 75            | 36.9         | 1,781  | gy. oz              | Do.                   |
| 2569                    | Aug. 31 | 39 26 00  | 68 03 30 | 75            | 37           | 1,782  | gy. oz              | Do.                   |
| 2570                    | Sept. 1 | 39 54 00  | 67 05 30 | 72            | 36.8         | 1,813  | glob. oz            | Do.                   |
| 2571                    | Sept. 1 | 40 09 30  | 67 09 00 | 72            | 37.8         | 1,356  | gy. glob. oz        | Do.                   |
| 2572                    | Sept. 2 | 40 29 00  | 66 04 00 | 72            | 37.8         | 1,769  | gy. oz              | Do.                   |
| 2573                    | Sept. 2 | 40 34 18  | 66 09 00 | 71            | 37.3         | 1,742  | gy. m. s            | S. B. T.              |
| 2574                    | Sept. 3 | 41 02 30  | 65 08 15 | 71            | 36.7         | 1,791  | yl. glob. oz        | (c)                   |
| 2575                    | Sept. 3 | 41 07 00  | 65 26 30 | 71            | 37.1         | 1,710  | gy. oz              | Do.                   |
| 2576                    | Sept. 4 | 41 15 30  | 68 15 00 | 61            |              | 18     | crs. wh. s. yl. sp  | Do.                   |
| 2577                    | Sept. 4 | 41 17 00  | 68 21 00 | 61            |              | 32     | yl. s. p. hrd       | Do.                   |
| 2578                    | Sept. 4 | 41 20 30  | 68 34 30 | 60            | 54.4         | 37     | fine. wh. s. bk. sp | Do.                   |
| 2579                    | Sept. 4 | 41 23 00  | 68 47 00 | 61            | 42.2         | 70     | fine. dk. gy. s     | Do.                   |
| 2580                    | Sept. 4 | 41 25 30  | 69 01 00 | 62            | 42.4         | 83     | yl. s. bk. sp       | Do.                   |

a Dories lowered with trawl grapnels to drag for coral. Several sprays obtained.

b Lost trawl. c Dredge-rope parted, losing large beam-trawl and 521 fathoms of wire rope.



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                         | Date.    | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.                  | Instrument used, etc. |
|------------------------------------|----------|-----------|----------|---------------|--------------|--------|----------------------------------|-----------------------|
|                                    |          | Lat. N.   | Long. W. |               |              |        |                                  |                       |
| Cape Sable to Cape May.            |          |           |          |               |              |        |                                  |                       |
| 1885.                              |          |           |          |               |              |        |                                  |                       |
| 2581                               | Sept. 18 | 39 43 00  | 71 34 00 | 70            |              | 394    | gn. m                            | L. B. T.              |
| 2582                               | Sept. 18 | 39 50 00  | 71 43 00 | 70            | 47.2         | 137    | gn. m                            | Do.                   |
| 2583                               | Sept. 18 | 39 50 45  | 71 43 00 | 70            |              | 131    | gn. m. s                         | Do.                   |
| 2584                               | Sept. 19 | 39 05 30  | 72 23 20 | 72            | 39.5         | 541    | gy. m                            | Do.                   |
| 2585                               | Sept. 19 | 39 08 30  | 72 17 00 | 73            | 39           | 542    | dk. gy. m                        | (a)                   |
| 2586                               | Sept. 20 | 39 02 40  | 72 40 00 | 71            | 40.2         | 328    | dk. gy. m                        | S. B. T.              |
| 2587                               | Sept. 20 | 39 02 00  | 72 38 00 | 71            | 39.7         | 404    | dk. gy. m                        | Do.                   |
| 2588                               | Sept. 20 | 39 02 00  | 72 36 00 | 71            | 39.5         | 479    | gn. m                            | Do.                   |
| 2589                               | Sept. 21 | 38 55 00  | 72 50 30 | 70            | 44.2         | 231    | gn. m. s                         | Do.                   |
| 2590                               | Sept. 21 | 38 53 30  | 72 52 00 | 71            | 47.6         | 190    | gn. m. s                         | Do.                   |
| 2591                               | Sept. 21 | 38 53 30  | 72 52 00 | 71            |              | 188    | gn. m. s                         | Do.                   |
| Cape Hatteras to Charleston, S. C. |          |           |          |               |              |        |                                  |                       |
| 2592                               | Oct. 17  | 35 02 20  | 75 12 00 | 79            |              | 120    | fne. gy. s                       | L. B. T.              |
| 2593                               | Oct. 17  | 35 01 19  | 75 12 00 | 79            |              | 143    | gy. s. bk. sp                    | Do.                   |
| 2594                               | Oct. 17  | 35 01 00  | 75 12 00 | 78            |              | 160    | crs. gy. s. brk. sh              | Do.                   |
| 2595                               | Oct. 17  | 35 08 00  | 75 05 30 | 78            |              | 63     | gy. s. brk. sh                   | Do.                   |
| 2596                               | Oct. 17  | 35 08 30  | 75 10 00 | 78            |              | 49     | gy. s                            | Do.                   |
| 2597                               | Oct. 18  | 34 57 00  | 75 43 30 | 76            |              | 15     | crs. gy. s                       | Do.                   |
| 2598                               | Oct. 18  | 34 51 00  | 75 40 15 | 77            |              | 22     | wh. s. brk. sh                   | Do.                   |
| 2599                               | Oct. 18  | 34 45 20  | 75 38 10 | 77            |              | 25     | wh. s. brk. sh                   | Do.                   |
| 2600                               | Oct. 18  | 34 39 30  | 75 35 30 | 78            |              | 87     | fne. gy. s. bk. sp.<br>brk. sh.  | Do.                   |
| 2601                               | Oct. 18  | 34 39 15  | 75 33 30 | 78            |              | 107    | gy. s. p                         | Do.                   |
| 2602                               | Oct. 18  | 34 38 30  | 75 33 30 | 78            |              | 124    | s. r                             | Do.                   |
| 2603                               | Oct. 18  | 34 38 30  | 75 33 30 | 77            |              | 124    | s. r                             | Do.                   |
| 2604                               | Oct. 18  | 34 37 30  | 75 39 45 | 78            |              | 34     | yl. s. brk. sh                   | Do.                   |
| 2605                               | Oct. 18  | 34 35 30  | 75 45 30 | 78            |              | 32     | wh. s. bk. sp                    | Do.                   |
| 2606                               | Oct. 18  | 34 35 15  | 75 52 00 | 78            |              | 25     | wh. s. bk. sp                    | Do.                   |
| 2607                               | Oct. 19  | 34 38 00  | 76 12 00 | 76            |              | 18     | fne. gy. s                       | Do.                   |
| 2608                               | Oct. 19  | 34 32 00  | 76 12 00 | 76            |              | 22     | crs. gy. s. bk. sp               | Do.                   |
| 2609                               | Oct. 19  | 34 26 00  | 76 12 00 | 78            |              | 22     | fne. gy. s                       | Do.                   |
| 2610                               | Oct. 19  | 34 20 00  | 76 12 00 | 75            |              | 22     | wh. s. bk. sp. brk.<br>sh.       | Do.                   |
| 2611                               | Oct. 19  | 34 15 00  | 76 11 30 | 75            |              | 31     | bk. s. brk. sh                   | Do.                   |
| 2612                               | Oct. 19  | 34 11 00  | 76 10 30 | 78            |              | 52     | crs. wh. s. brk. sh              | Do.                   |
| 2613                               | Oct. 19  | 34 09 00  | 76 02 00 | 78            |              | 168    | gy. s. bk. sp                    | Do.                   |
| 2614                               | Oct. 19  | 34 09 00  | 76 02 00 | 78            |              | 168    | gy. s. bk. sp                    | Do.                   |
| 2615                               | Oct. 20  | 33 45 00  | 77 25 00 | 75            |              | 18     | gy. s                            | Dredge.               |
| 2616                               | Oct. 20  | 33 42 45  | 77 31 00 | 75            |              | 17     | s. p                             | Do.                   |
| 2617                               | Oct. 20  | 33 37 30  | 77 36 30 | 75            |              | 14     | crs. yl. s. brk. sh              | Do.                   |
| 2618                               | Oct. 20  | 33 37 15  | 77 35 30 | 74            |              | 17     | crs. yl. s. brk. sh              | S. B. T.              |
| 2619                               | Oct. 20  | 33 38 00  | 77 36 00 | 74            |              | 15     | crs. yl. s. brk. sp.<br>rot. co. | Dredge.               |
| 2620                               | Oct. 20  | 33 37 45  | 77 36 30 | 75            |              | 15     | gv. s. rot. co                   | S. B. T.              |
| 2621                               | Oct. 20  | 33 34 00  | 77 42 00 | 75            |              | 9      | gy. s. brk. co                   | Do.                   |
| 2622                               | Oct. 20  | 33 38 00  | 77 36 00 | 74            |              | 15     | gv. s. brk. co                   | Do.                   |
| 2623                               | Oct. 20  | 33 38 00  | 77 36 00 | 74            |              | 15     | gy. s. brk. co                   | Do.                   |
| 2624                               | Oct. 21  | 32 36 00  | 77 29 15 | 78            |              | 258    | gy. s. bk. sp                    | L. B. T.              |
| 2625                               | Oct. 21  | 32 35 00  | 77 30 00 | 76            |              | 247    | gy. s. bk. sp                    | Do.                   |
| 2626                               | Oct. 21  | 32 27 30  | 77 20 30 | 76            |              | 353    | fne. gy. s                       | Do.                   |
| 2627                               | Oct. 21  | 32 21 30  | 77 07 00 | 77            |              | 437    | yl. m                            | Do.                   |
| 2628                               | Oct. 21  | 32 24 00  | 76 55 30 | 77            |              | 528    | yl. m                            | Do.                   |
| Bahamas, Florida, and Cuba.        |          |           |          |               |              |        |                                  |                       |
| 1886.                              |          |           |          |               |              |        |                                  |                       |
| 2629                               | Mar. 8   | 23 48 40  | 75 10 40 | 73            | 38.4         | 1,169  | co. s                            | L. B. T.              |
| 2630                               | Mar. 12  | 24 39 45  | 76 11 30 | 72            | 61.8         | 244    | co. s                            | Tgls.                 |
| 2631                               | Mar. 12  | 24 39 30  | 76 11 00 | 72            | 59.8         | 280    | co. s                            | Do.                   |
| 2632                               | Mar. 13  | 24 30 43  | 76 23 45 | 73            | 39.4         | 791    | co. s. gy. oz                    | L. B. T.              |
| 2633                               | Apr. 7   | 23 11 00  | 82 19 30 | 76            | 60.8         | 208    | co. s                            | Tgls.                 |
| 2634                               | Apr. 7   | 23 10 45  | 82 18 45 | 76            |              | 162    | br. s. brk. sh                   | Do.                   |
| 2635                               | Apr. 7   | 23 10 55  | 82 18 55 | 73            | 62.8         | 208    | dead co. sh                      | Do.                   |
| 2636                               | Apr. 7   | 23 10 45  | 82 18 45 | 73            | 62.6         | 191    | dead co. sh                      | Do.                   |
| 2637                               | Apr. 7   | 23 10 45  | 82 19 00 | 75            | 65.8         | 143    | dead co. sh                      | Do.                   |
| 2638                               | Apr. 7   | 23 17 45  | 82 18 00 | 76            | 39.6         | 1,025  | yl. s                            | L. B. T.              |
| 2639                               | Apr. 9   | 25 04 50  | 80 15 10 | 73            |              | 56     | co. s                            | Bl. Dr.               |
| 2640                               | Apr. 9   | 25 05 00  | 80 15 00 | 73            |              | 56     | co. s                            | L. B. T.              |
| 2641                               | Apr. 9   | 25 11 30  | 80 10 00 | 74            | 69.2         | 60     | co. s                            | Do.                   |
| 2642                               | Apr. 9   | 25 20 30  | 79 58 00 | 74            | 42.6         | 217    | gy. s                            | Do.                   |
| 2643                               | Apr. 9   | 25 25 00  | 79 55 15 | 74            | 43.1         | 211    | gy. s                            | Do.                   |
| 2644                               | Apr. 9   | 25 40 00  | 80 09 00 | 73            | 43.4         | 193    | gy. s                            | Bl. Dr.               |
| 2645                               | Apr. 9   | 25 46 30  | 80 02 00 | 75            | 43.4         | 157    | gn. s                            | Do.                   |

a Lost trawl.



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                  | Date.   | Position. |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom.               | Instrument used, etc. |
|-----------------------------|---------|-----------|----------|---------------|--------------|--------|-------------------------------|-----------------------|
|                             |         | Lat. N.   | Long. W. |               |              |        |                               |                       |
| Bahamas, Florida, and Cuba. |         |           |          |               |              |        |                               |                       |
| 1886.                       |         |           |          |               |              |        |                               |                       |
| 2646                        | Apr. 9  | 25 47 00  | 80 05 00 | 75            | -----        | 85     | gy. s. for                    | Bl. Dr.               |
| 2647                        | Apr. 9  | 25 48 00  | 80 04 00 | 75            | -----        | 85     | gy. s. for                    | Do.                   |
| 2648                        | Apr. 9  | 25 53 00  | 80 03 30 | 73            | -----        | 84     | gn. m                         | Do.                   |
| 2649                        | Apr. 12 | 23 34 00  | 76 33 00 | 74            | 74.2         | 36     | co. s                         | Tgis.                 |
| 2650                        | Apr. 12 | 23 34 30  | 76 34 00 | 74            | 57.8         | 369    | co. s. wh. oz                 | Do.                   |
| 2651                        | Apr. 13 | 24 02 00  | 77 12 45 | 74            | 73.4         | 97     | wh. oz                        | Do.                   |
| 2652                        | Apr. 13 | 24 12 30  | 77 13 00 | 74            | 67.1         | 140    | wh. m                         | Bl. Dr.               |
| 2653                        | Apr. 14 | 24 52 30  | 77 39 00 | 74            | 39.1         | 1,000  | lt. br. oz                    | L. B. T.              |
| 2654                        | May 2   | 27 57 30  | 77 27 30 | 73            | 39.3         | 660    | yl. oz. bk. sp.               | Do.                   |
| 2655                        | May 2   | 27 22 00  | 78 07 30 | 76            | 47.5         | 338    | gy. s.                        | Do.                   |
| Bahamas to Cape Fear, N. C. |         |           |          |               |              |        |                               |                       |
| 2656                        | May 3   | 27 58 30  | 78 24 00 | 71            | 41.2         | 572    | for                           | L. B. T.              |
| 2657                        | May 3   | 28 08 00  | 78 28 00 | 73            | 44.7         | 540    | for                           | Do.                   |
| 2658                        | May 3   | 28 21 00  | 78 33 00 | 73            | 44.7         | 514    | for. brk. sh                  | Do.                   |
| 2659                        | May 3   | 28 32 00  | 78 42 00 | 74            | 45.2         | 509    | br. for                       | Do.                   |
| 2660                        | May 3   | 28 40 00  | 78 46 00 | 74            | 45.7         | 504    | yl. for                       | Do.                   |
| 2661                        | May 4   | 29 16 30  | 79 36 30 | 75            | 45.5         | 438    | gy. s. bk. sp                 | Do.                   |
| 2662                        | May 4   | 29 24 30  | 79 43 00 | 75            | 43.7         | 434    | gy. s. brk. sh                | Do.                   |
| 2663                        | May 4   | 29 39 00  | 79 49 00 | 77            | 42.7         | 421    | br. s                         | Do.                   |
| 2664                        | May 4   | 29 41 00  | 79 55 00 | 75            | 42.7         | 373    | co. s                         | Do.                   |
| 2665                        | May 4   | 29 47 00  | 80 05 45 | 76            | 45.2         | 263    | fne. gy. s                    | Do.                   |
| 2666                        | May 5   | 30 47 30  | 79 49 00 | 74            | 48.3         | 270    | gy. s                         | Do.                   |
| 2667                        | May 5   | 30 53 00  | 79 42 30 | 75            | 48.7         | 273    | gy. s. bk. sp                 | Do.                   |
| 2668                        | May 5   | 30 58 30  | 79 38 30 | 76            | 46.3         | 294    | gy. s. dd. co                 | Do.                   |
| 2669                        | May 5   | 31 09 00  | 79 33 30 | 77            | 43.7         | 352    | gy. s. dd. co                 | Do.                   |
| 2670                        | May 5   | 31 20 00  | 79 22 00 | 74            | 44.5         | 280    | gy. s. dd. co                 | Do.                   |
| 2671                        | May 5   | 31 20 00  | 79 22 00 | 77            | -----        | 280    | gy. s. dd. co                 | Tgis.                 |
| 2672                        | May 5   | 31 31 00  | 79 05 00 | 77            | 54.3         | 277    | crs. br. s                    | Do.                   |
| 2673                        | May 6   | 32 26 00  | 77 43 30 | 77            | 51.6         | 240    | co. gy. s. bk. sp             | L. B. T.              |
| 2674                        | May 6   | 32 32 00  | 77 17 00 | 76            | 46           | 316    | gy. s. bk. sp. sh             | Do.                   |
| 2675                        | May 6   | 32 32 30  | 77 15 00 | 75            | 45.8         | 327    | gy. s. bk. sp. sh             | Do.                   |
| 2676                        | May 6   | 32 39 00  | 77 01 00 | 77            | 45.8         | 407    | gn. oz. gy. s                 | Do.                   |
| 2677                        | May 6   | 32 39 00  | 76 50 30 | 78            | 39.3         | 478    | gn. m                         | Do.                   |
| 2678                        | May 6   | 32 40 00  | 76 40 30 | 77            | 38.7         | 731    | lt. gy. oz                    | Do.                   |
| 2679                        | May 6   | 32 40 00  | 76 40 30 | 75            | 38.6         | 782    | lt. gy. oz                    | Do.                   |
| Long Island to Nantucket.   |         |           |          |               |              |        |                               |                       |
| 2680                        | July 16 | 39 50 00  | 70 26 00 | -----         | -----        | 555    | No specimen                   | L. B. T.              |
| 2681                        | July 16 | 39 43 00  | 70 29 00 | -----         | -----        | 990    | gn. m                         | Do.                   |
| 2682                        | July 16 | 39 38 00  | 70 22 00 | -----         | -----        | 1,004  | gn. m. s                      | Do.                   |
| 2683                        | July 17 | 39 33 00  | 70 50 00 | -----         | -----        | 887    | br. oz                        | Do.                   |
| 2684                        | July 17 | 39 35 00  | 70 54 00 | -----         | -----        | 1,106  | br. c. bk. sp                 | Do.                   |
| 2685                        | July 17 | 39 35 00  | 71 02 30 | -----         | -----        | 1,137  | gn. m. wh. sp                 | Do.                   |
| 2686                        | July 18 | 39 52 00  | 71 20 45 | -----         | -----        | 226    | gn. m                         | Do.                   |
| 2687                        | July 18 | 39 46 00  | 71 19 00 | -----         | -----        | 326    | gn. m                         | Do.                   |
| 2688                        | July 18 | 39 42 00  | 71 12 00 | -----         | -----        | 644    | gn. m                         | Do.                   |
| 2689                        | July 18 | 39 42 00  | 71 15 30 | -----         | -----        | 525    | gn. m                         | Do.                   |
| 2690                        | July 18 | 39 39 00  | 71 11 00 | -----         | -----        | 643    | gn. m                         | Do.                   |
| 2691                        | July 18 | 39 37 00  | 71 08 00 | -----         | -----        | 835    | lt. gn. m                     | Do.                   |
| Off Newfoundland.           |         |           |          |               |              |        |                               |                       |
| 2692                        | Aug. 11 | 46 50 00  | 44 35 00 | -----         | -----        | 73     | gy. s. sml. bk. st.           | L. B. T.              |
| 2693                        | Aug. 11 | 46 53 00  | 44 39 30 | -----         | -----        | 78     | rd. and gn. s. bk. and gy. p. | Do.                   |
| 2694                        | Aug. 11 | 46 52 30  | 44 54 30 | -----         | -----        | 86     | gy. s. bk. sp                 | Do.                   |
| 2695                        | Aug. 11 | 46 51 30  | 45 06 30 | -----         | -----        | 105    | gy. s. bk. sp. p              | Do.                   |
| 2696                        | Aug. 11 | 46 53 30  | 45 05 30 | -----         | -----        | 98     | gy. s. bk. sp                 | Do.                   |
| 2697                        | Aug. 12 | 47 40 00  | 47 35 30 | -----         | -----        | 206    | gn. m. bk. sp                 | Do.                   |
| 2698                        | Aug. 22 | 45 07 00  | 55 09 00 | -----         | -----        | 90     | gy. s. bk. sp. p              | Do.                   |
| 2699                        | Aug. 22 | 45 04 00  | 55 23 00 | -----         | -----        | 72     | co.                           | Do.                   |
| 2700                        | Aug. 22 | 44 56 30  | 55 48 00 | -----         | -----        | 59     | gy. s. bk. sp                 | Do.                   |
| 2701                        | Aug. 22 | 44 56 00  | 55 49 30 | -----         | -----        | 75     | gy. s. bk. sp                 | Do.                   |
| 2702                        | Aug. 22 | 44 50 00  | 56 19 30 | -----         | -----        | 215    | gn. m                         | Do.                   |
| Cape Breton to Nantucket.   |         |           |          |               |              |        |                               |                       |
| 2703                        | Aug. 23 | 44 01 00  | 59 02 30 | -----         | -----        | 140    | gy. s. bk. sp                 | L. B. T.              |
| 2704                        | Aug. 23 | 43 32 00  | 59 22 00 | -----         | -----        | 110    | gy. s. bk. sp                 | Do.                   |
| 2705                        | Aug. 24 | 42 47 00  | 61 04 00 | -----         | -----        | 1,255  | lt. tr. oz                    | Do.                   |
| 2706                        | Aug. 27 | 41 28 30  | 65 35 30 | -----         | -----        | 1,188  | gy. oz. for                   | Do.                   |
| 2707                        | Aug. 27 | 41 24 00  | 65 48 00 | -----         | -----        | 1,099  | br. oz. for                   | Do.                   |
| 2708                        | Aug. 28 | 40 07 00  | 67 49 00 | -----         | -----        | 980    | br. oz                        | Do.                   |
| 2709                        | Aug. 28 | 40 07 00  | 67 54 00 | -----         | -----        | 866    | br. m                         | Do.                   |
| 2710                        | Aug. 28 | 40 06 00  | 68 01 30 | -----         | -----        | 984    | gn. m                         | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                   | Date.    | Position.     |          | Surface temp. | Bottom temp. | Depth. | Kind of bottom. | Instrument used, etc. |
|------------------------------|----------|---------------|----------|---------------|--------------|--------|-----------------|-----------------------|
|                              |          | Lat. N.       | Long. W. |               |              |        |                 |                       |
| Nantucket to Cape Charles.   |          |               |          |               |              |        |                 |                       |
| 1886.                        |          | ° ' "         | ° ' "    | ° F.          | ° F.         | Fms.   |                 |                       |
| 2711                         | Sept. 16 | 38 59 00      | 70 07 00 | ---           | ---          | 1,544  | glob. oz        | L. B. T.              |
| 2712                         | Sept. 17 | 38 20 00      | 70 05 30 | ---           | ---          | 1,867  | br. oz          | Do.                   |
| 2713                         | Sept. 17 | 38 20 00      | 70 08 30 | ---           | ---          | 1,859  | br. oz          | Do.                   |
| 2714                         | Sept. 17 | 38 22 00      | 70 17 30 | ---           | ---          | 1,825  | br. oz          | Do.                   |
| 2715                         | Sept. 18 | 38 29 30      | 70 54 30 | ---           | ---          | 1,753  | br. oz          | Do.                   |
| 2716                         | Sept. 18 | 38 29 30      | 70 57 00 | ---           | ---          | 1,631  | br. oz. for     | Do.                   |
| 2717                         | Sept. 18 | 38 24 00      | 71 13 00 | ---           | ---          | 1,615  | br. oz          | Do.                   |
| 2718                         | Sept. 19 | 38 24 00      | 71 52 00 | ---           | ---          | 1,569  | br. oz          | Do.                   |
| 2719                         | Sept. 19 | 38 29 00      | 71 58 00 | ---           | ---          | 1,536  | gy. oz          | Do.                   |
| 2720                         | Sept. 19 | 38 36 30      | 72 12 00 | ---           | ---          | 1,509  | gy. oz          | Do.                   |
| 2721                         | Sept. 20 | 38 56 00      | 72 11 30 | ---           | ---          | 813    | gy. oz          | Do.                   |
| 2722                         | Sept. 20 | 39 13 00      | 72 01 00 | ---           | ---          | 594    | gn. m           | Do.                   |
| 2723                         | Oct. 23  | 36 47 00      | 73 09 30 | ---           | ---          | 1,685  | gy. oz. for     | Do.                   |
| 2724                         | Oct. 23  | 36 47 00      | 73 25 00 | ---           | ---          | 1,641  | gy. oz. for     | Do.                   |
| 2725                         | Oct. 24  | 36 34 00      | 73 48 00 | ---           | ---          | 1,374  | gy. oz. for     | Do.                   |
| 2726                         | Oct. 24  | 36 34 00      | 73 54 30 | ---           | ---          | 1,253  | gy. oz          | Do.                   |
| 2727                         | Oct. 24  | 36 35 00      | 74 03 30 | ---           | ---          | 1,239  | gy. oz          | Do.                   |
| 2728                         | Oct. 25  | 36 30 00      | 74 33 00 | ---           | ---          | 859    | gy. oz          | Do.                   |
| 2729                         | Oct. 25  | 36 36 00      | 74 32 00 | ---           | ---          | 679    | dk. gn. m       | Do.                   |
| 2730                         | Oct. 25  | 36 42 00      | 74 30 00 | ---           | ---          | 727    | gn. m. for      | Do.                   |
| 2731                         | Oct. 25  | 36 45 00      | 74 28 00 | ---           | ---          | 781    | gy. oz          | Do.                   |
| 2732                         | Oct. 26  | 37 27 00      | 73 33 00 | ---           | ---          | 1,152  | dk. gn. m       | Do.                   |
| 2733                         | Oct. 26  | 37 26 00      | 73 43 00 | ---           | ---          | 944    | gn. m           | Do.                   |
| 2734                         | Oct. 26  | 37 23 00      | 73 53 00 | ---           | ---          | 841    | sft. gn. m      | Do.                   |
| 2735                         | Oct. 26  | 37 23 00      | 74 02 00 | ---           | ---          | 811    | sft. gn. m      | Do.                   |
| 1887.                        |          |               |          |               |              |        |                 |                       |
| 2736                         | Apr. 8   | Hampton Roads |          | 46            | 46           | 11     | s               | S. B. T.              |
| 2737                         | Apr. 8   | do            |          | 46            | 47           | 12     | s               | Do.                   |
| Cape Charles to Long Island. |          |               |          |               |              |        |                 |                       |
| 2738                         | Sept. 16 | 36 52 00      | 74 23 00 | 70            | 38           | 958    | gn. m           | L. B. T.              |
| 2739                         | Sept. 17 | 37 34 30      | 73 58 00 | 69            | 38.2         | 811    | gy. m           | Do.                   |
| 2740                         | Sept. 17 | 37 40 00      | 73 50 00 | 70            | 38           | 1,011  | br. oz          | Do.                   |
| 2741                         | Sept. 17 | 37 44 00      | 73 57 00 | 70            | 38           | 852    | gn. m           | Do.                   |
| 2742                         | Sept. 17 | 37 46 30      | 73 56 30 | 69            | 38           | 865    | gn. m           | Do.                   |
| 2743                         | Sept. 18 | 38 31 00      | 72 53 00 | 67            | 37.8         | 1,155  | gn. oz          | Do.                   |
| 2744                         | Sept. 18 | 38 35 00      | 73 05 15 | 69            | 39           | 554    | bu. m           | Do.                   |
| 2745                         | Sept. 18 | 38 42 00      | 73 05 30 | 68            | 41.8         | 224    | gn. m           | Do.                   |
| 2746                         | Sept. 18 | 38 46 00      | 73 05 45 | 68            | 51.2         | 102    | gr. s           | Do.                   |
| 2747                         | Sept. 19 | 39 27 00      | 71 15 00 | 67            | 37.5         | 1,276  | bu. m           | Do.                   |
| 2748                         | Sept. 19 | 39 31 00      | 71 14 30 | 68            | 37.8         | 1,163  | gy. m. for      | Do.                   |
| 2749                         | Sept. 19 | 39 42 00      | 71 17 00 | 67            | 38.8         | 705    | gn. oz          | Do.                   |
| Lesser Antilles.             |          |               |          |               |              |        |                 |                       |
| 2750                         | Nov. 27  | 18 30 00      | 63 31 00 | 80            | 44.5         | 496    | fne. gy. s      | 2 S. D.               |
| 2751                         | Noy. 23  | 16 54 00      | 63 12 00 | 81            | 40           | 687    | bu. glob. oz    | L. B. T.              |
| 2752                         | Dec. 4   | 13 34 00      | 61 04 00 | 82            | 48           | 281    | bk. s           | Do.                   |
| 2753                         | Dec. 4   | 13 34 00      | 61 03 00 | 83            | 48           | 281    | bk. s           | T.                    |
| 2754                         | Dec. 5   | 11 40 00      | 58 33 00 | 84            | 38           | 880    | glob. oz        | L. B. T.              |
| East coast South America.    |          |               |          |               |              |        |                 |                       |
| 2755                         | Dec. 7   | 8 04 00       | 52 47 00 | 81            | 40           | 720    | bu. m           | L. B. T.              |
| Lat. S.                      |          |               |          |               |              |        |                 |                       |
| 2756                         | Dec. 14  | 3 22 00       | 37 49 00 | 79            | 40.5         | 417    | gy. spk. sp     | S. B. T.              |
| 2757                         | Dec. 16  | 6 59 00       | 34 47 00 | 79            | 79           | 20     | brk. sh         | S. D.                 |
| 2758                         | Dec. 16  | 6 59 30       | 34 47 00 | 79            | 79           | 20     | brk. sh         | Do.                   |
| 2759                         | Dec. 16  | 7 00 00       | 34 47 00 | 79            | 79           | 20     | brk. sh         | S. B. T.              |
| 2760                         | Dec. 18  | 12 07 00      | 37 17 00 | 80            | 39.5         | 1,019  | br. co          | L. B. T.              |
| 2761                         | Dec. 26  | 15 36 00      | 38 32 54 | 79            | 39           | 818    | pter. oz        | Do.                   |
| 2762                         | Dec. 30  | 23 08 00      | 41 34 00 | 70            | 57.1         | 59     | bu. m           | S. D.                 |
| 2763                         | Dec. 30  | 24 17 00      | 42 48 30 | 75            | 37.9         | 671    | br. glob. oz    | L. B. T.              |
| 1888.                        |          |               |          |               |              |        |                 |                       |
| 2764                         | Jan. 12  | 36 42 00      | 56 23 00 | 68            | ---          | 11.5   | s. brk. sh      | L. B. T.              |
| 2765                         | Jan. 12  | 36 43 00      | 56 23 00 | 69            | ---          | 10.5   | s. brk. sh      | Do.                   |
| 2766                         | Jan. 12  | 36 47 00      | 56 23 00 | 68            | ---          | 10.5   | s. brk. sh      | Do.                   |
| 2767                         | Jan. 13  | 40 03 00      | 58 56 00 | 64            | ---          | 52     | fne. dk. s      | Do.                   |
| 2768                         | Jan. 14  | 42 24 00      | 61 38 30 | 61            | ---          | 43     | dk. s. bk. sp   | Do.                   |
| 2769                         | Jan. 15  | 45 22 00      | 64 20 00 | 58            | 56.6         | 51.5   | gn. m. fne. s   | Do.                   |
| 2770                         | Jan. 16  | 48 37 00      | 65 46 00 | 52            | ---          | 58     | gy. s. bk. sp   | Do.                   |
| 2771                         | Jan. 17  | 51 34 00      | 68 00 00 | 50            | 49.4         | 50.5   | gy. s. bk. sp   | Do.                   |
| 2772                         | Jan. 17  | 52 16 00      | 68 13 00 | 52            | ---          | 31.5   | fne. gy. s      | Do.                   |
| 2773                         | Jan. 17  | 52 23 00      | 68 11 00 | 51            | ---          | 10     | fne. gy. s      | S. B. T.              |
| Straits of Magellan.         |          |               |          |               |              |        |                 |                       |
| 2774                         | Jan. 18  | 52 23 00      | 68 31 30 | 49            | ---          | 17     | s. g            | S. B. T.              |
| 2775                         | Jan. 18  | 52 22 30      | 69 22 00 | 51            | ---          | 29.5   | s. st           | Do.                   |
| 2776                         | Jan. 18  | 52 41 00      | 69 55 30 | 51            | ---          | 21     | s. g            | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.        | Instrument used, etc. |
|---------------------------|---------|-----------|-----------|---------------|--------------|--------|------------------------|-----------------------|
|                           |         | Lat. S.   | Long. W.  |               |              |        |                        |                       |
| Straits of Magellan.      |         |           |           |               |              |        |                        |                       |
|                           | 1888.   | ° ' "     | ° ' "     | ° F.          | ° F.         | Fms.   |                        |                       |
| 2777                      | Jan. 19 | 52 38 00  | 70 10 30  | 51            | -----        | 19.75  | g.-----                | S. B. T.              |
| 2778                      | Jan. 23 | 53 01 00  | 70 42 15  | 49            | 47.9         | 61     | gy. s. bk. sp.-----    | L. B. T.              |
| 2779                      | Jan. 23 | 53 06 00  | 70 40 30  | 49            | 46.9         | 77.5   | gn. oz.-----           | Do.                   |
| Off Chile, South America. |         |           |           |               |              |        |                        |                       |
| 2780                      | Feb. 2  | 53 01 00  | 73 42 30  | 51            | 46.9         | 369    | gn. m.-----            | L. B. T.              |
| 2781                      | Feb. 4  | 51 52 00  | 73 41 00  | 51            | 49.9         | 348    | bu. m.-----            | Do.                   |
| 2782                      | Feb. 6  | 51 12 00  | 74 13 30  | 49            | 47.9         | 258    | bu. m.-----            | S. B. T.              |
| 2783                      | Feb. 6  | 51 02 30  | 74 08 30  | 49            | 47.9         | 122    | bu. m.-----            | Do.                   |
| 2784                      | Feb. 8  | 48 41 00  | 74 24 00  | 55            | 51.9         | 194    | bu. m.-----            | L. B. T.              |
| 2785                      | Feb. 8  | 48 09 00  | 74 36 00  | 57            | 46.9         | 449    | bu. m.-----            | Do.                   |
| 2786                      | Feb. 9  | 46 46 00  | 75 16 30  | 57            | 54.9         | 57     | gn. m.-----            | Do.                   |
| 2787                      | Feb. 9  | 46 47 30  | 75 15 00  | 57            | 53.9         | 61     | gn. m.-----            | Do.                   |
| 2788                      | Feb. 11 | 45 35 00  | 75 55 00  | 58            | 36.9         | 1,050  | gn. m.-----            | Do.                   |
| 2789                      | Feb. 12 | 42 36 00  | 75 28 00  | 60            | 35.9         | 1,342  | bu. m.-----            | Do.                   |
| 2790                      | Feb. 13 | 39 21 00  | 74 42 00  | 62            | 35.9         | 1,287  | gn. m.-----            | Do.                   |
| 2791                      | Feb. 14 | 38 08 00  | 75 53 00  | 61            | 37.9         | 677    | yl. m.-----            | Do.                   |
| Ecuador to Panama.        |         |           |           |               |              |        |                        |                       |
| 2792                      | Mar. 2  | 00 37 00  | 81 00 00  | 77            | 42.9         | 401    | gn. m.-----            | L. B. T.              |
|                           |         | Lat. N.   |           |               |              |        |                        |                       |
| 2793                      | Mar. 3  | 01 03 00  | 80 15 00  | 78            | 38.4         | 741    | gn. m.-----            | Do.                   |
| 2794                      | Mar. 5  | 07 37 00  | 78 46 30  | 78            | 59.6         | 62     | gy. s. bk. sp. brk. sh | S. B. T.              |
| 2795                      | Mar. 5  | 07 57 00  | 78 55 00  | 78            | 64.1         | 33     | gy. s. bk. sp. brk. sh | L. B. T.              |
| 2796                      | Mar. 5  | 08 05 00  | 78 51 00  | 78            | -----        | 33     | gy. s. brk. sh.-----   | Oyster.               |
| 2797                      | Mar. 5  | 08 06 30  | 78 51 00  | 78            | -----        | 33     | gy. s. brk. sh.-----   | L. B. T.              |
| 2798                      | Mar. 5  | 08 10 30  | 78 50 30  | 78            | -----        | 18     | gy. s. brk. sh.-----   | Do.                   |
| 2799                      | Mar. 6  | 08 44 00  | 79 09 00  | 75            | -----        | 29.5   | gn. m.-----            | Do.                   |
| 2800                      | Mar. 30 | 08 51 00  | 79 31 30  | 77            | -----        | 7      | gn. m.-----            | Do.                   |
| 2801                      | Mar. 30 | 08 47 00  | 79 29 30  | 78            | -----        | 14     | gn. m.-----            | Do.                   |
| 2802                      | Mar. 30 | 08 38 00  | 79 31 30  | 78            | -----        | 16     | gn. m.-----            | Do.                   |
| 2803                      | Mar. 30 | 08 27 00  | 79 35 00  | 78            | -----        | 26     | gn. m.-----            | Do.                   |
| 2804                      | Mar. 30 | 08 16 30  | 79 37 45  | 81            | -----        | 47     | gn. m.-----            | Do.                   |
| 2805                      | Mar. 30 | 07 56 00  | 79 41 30  | 78            | -----        | 51.5   | gn. m.-----            | Do.                   |
| Galapagos Islands.        |         |           |           |               |              |        |                        |                       |
| 2806                      | Apr. 3  | 00 30 00  | 88 37 30  | 80            | 36.4         | 1,379  | br. glob. oz.-----     | L. B. T.              |
|                           |         | Lat. S.   | Long. W.  |               |              |        |                        |                       |
| 2807                      | Apr. 4  | 00 24 00  | 89 06 00  | 79            | 38.5         | 812    | glob. oz. co. m.-----  | Do.                   |
| 2808                      | Apr. 4  | 00 36 30  | 89 19 00  | 79            | 39.9         | 634    | co. s.-----            | Do.                   |
| 2809                      | Apr. 4  | 00 50 00  | 89 36 00  | 79            | 74.1         | 45     | gy. s.-----            | S. B. T.              |
| 2810                      | Apr. 7  | 01 22 00  | 89 39 30  | 81            | -----        | 6.5    | co. s.-----            | Tangles.              |
| 2811                      | Apr. 7  | 01 21 30  | 89 39 30  | 81            | -----        | 19     | co. s.-----            | S. B. T.              |
| 2812                      | Apr. 7  | 01 21 30  | 89 39 45  | 81            | -----        | 20     | co. s.-----            | Tangles.              |
| 2813                      | Apr. 7  | 01 21 00  | 89 40 15  | 81            | -----        | 40     | co. s.-----            | S. Dredge.            |
| 2814                      | Apr. 9  | 01 17 30  | 90 30 00  | 79            | -----        | 20     | hrd.-----              | Do.                   |
| 2815                      | Apr. 9  | 01 17 30  | 90 30 15  | 79            | -----        | 33.5   | gy. s. bk. sp.-----    | Tangles.              |
| 2816                      | Apr. 9  | 01 17 00  | 90 31 30  | 79            | -----        | 78.5   | gy. s. fne. g.-----    | Do.                   |
| 2817                      | Apr. 15 | 00 46 00  | 89 42 00  | 80            | 46.9         | 271    | wh. s.-----            | S. B. T.              |
| 2818                      | Apr. 15 | 00 29 00  | 89 54 30  | 83            | 43.9         | 392    | wh. and bk s.-----     | L. B. T.              |
| 2819                      | Apr. 15 | 00 08 00  | 90 06 00  | 83            | 39.9         | 671    | wh. s.-----            | Do.                   |
| Off Manzanillo, Mexico.   |         |           |           |               |              |        |                        |                       |
|                           |         | Lat. N.   | Long. W.  |               |              |        |                        |                       |
| 2820                      | Apr. 26 | 18 43 00  | 104 04 00 | 85            | 45.9         | 294    | br. m.-----            | L. B. T.              |
| 2821                      | Apr. 26 | 18 52 00  | 10 10 30  | 84            | 53.9         | 117    | br. m.-----            | Do.                   |
| Gulf of California.       |         |           |           |               |              |        |                        |                       |
| 2822                      | Apr. 30 | 24 16 00  | 110 22 00 | 73            | -----        | 21     | gy. s. brk. sh.-----   | S. B. T.              |
| 2823                      | Apr. 30 | 24 18 00  | 110 22 00 | 73            | -----        | 26.5   | brk. sh.-----          | L. B. T.              |
| 2824                      | Apr. 30 | 24 22 30  | 110 19 30 | 73            | -----        | 8      | brk. sh.-----          | Tangles.              |
| 2825                      | Apr. 30 | 24 22 15  | 110 19 15 | 73            | -----        | 7      | brk. co.-----          | Ship dredge.          |
| 2826                      | Apr. 30 | 24 12 00  | 109 55 00 | 74            | -----        | 9.5    | sh.-----               | Oyster dredge.        |
| 2827                      | Apr. 30 | 24 11 45  | 109 55 00 | 74            | -----        | 10     | sh.-----               | Do.                   |
| 2828                      | Apr. 30 | 24 11 30  | 109 55 00 | 74            | -----        | 10     | sh.-----               | Do.                   |
| Off Lower California.     |         |           |           |               |              |        |                        |                       |
| 2829                      | May 1   | 22 52 00  | 109 55 00 | 75            | 74.1         | 31     | rky.-----              | Tangles.              |
| 2830                      | May 1   | 23 33 00  | 110 37 00 | 67            | 74.1         | 66     | fne. s.-----           | L. B. T.              |
| 2831                      | May 2   | 24 32 00  | 111 59 00 | 67            | -----        | 12     | fne. gy s.-----        | Do.                   |
| 2832                      | May 2   | 24 38 00  | 112 17 30 | 60            | 56.4         | 51     | gn. m.-----            | Do.                   |
| 2833                      | May 2   | 24 38 00  | 112 17 30 | 60            | -----        | 51     | gn. m.-----            | Tangles.              |
| 2834                      | May 3   | 26 14 00  | 113 13 00 | 61            | 53.9         | 48     | yl. m.-----            | L. B. T.              |
| 2835                      | May 4   | 26 42 30  | 113 34 15 | 56            | -----        | 5.5    | gn. m.-----            | Ship dredge.          |
| 2836                      | May 4   | 26 42 30  | 113 34 15 | 57            | -----        | 6      | gn. m.-----            | Oyster dredge.        |
| 2837                      | May 5   | 28 10 00  | 115 09 45 | 62            | -----        | 23     | fne. s.-----           | Ship dredge.          |
| 2838                      | May 5   | 28 12 00  | 115 09 00 | 62            | -----        | 44     | gn. m.-----            | L. B. T.              |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No. | Date.    | Position.                          |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc. |
|------------|----------|------------------------------------|-----------|---------------|--------------|--------|---------------------|-----------------------|
|            |          | Lat. N.                            | Long. W.  |               |              |        |                     |                       |
|            |          | Santa Barbara Islands, California. |           |               |              |        |                     |                       |
|            | 1888.    | ° ' "                              | ° ' "     | ° F.          | ° F.         | Fms.   |                     |                       |
| 2839       | May 8    | 33 08 00                           | 118 40 00 | 61            | 41.4         | 414    | gy. s               | L. B. T.              |
| 2840       | May 9    | 34 11 00                           | 120 15 00 | 54            | 43.9         | 27.6   | gn. m               | Do.                   |
|            |          | Unalaska to Cook Inlet.            |           |               |              |        |                     |                       |
| 2841       | July 23  | 54 18 00                           | 165 55 00 | 46            | 41           | 56     | p                   | S. B. T.              |
| 2842       | July 23  | 54 15 00                           | 166 03 00 | 46            | 41           | 72     | p                   | Do.                   |
| 2843       | July 28  | 53 56 00                           | 165 56 00 | 50            | 43.5         | 45     | brk. sh. and p      | Do.                   |
| 2844       | July 28  | 53 56 00                           | 165 40 00 | 48            | 42           | 54     | gy. s               | L. B. T.              |
| 2845       | July 29  | 54 05 00                           | 164 09 00 | 51            | 42           | 42     | crs. bk. s          | Do.                   |
| 2846       | July 30  | 54 08 00                           | 162 44 00 | 50            | 42           | 44     | g                   | Do.                   |
| 2847       | July 31  | 55 01 00                           | 160 12 00 | 51            | 42           | 48     | fne. gy. s          | Do.                   |
| 2848       | July 31  | 55 10 00                           | 160 18 00 | 49            | 41           | 110    | gn. m               | Do.                   |
| 2849       | Aug. 2   | 55 16 00                           | 160 28 00 | 51            | 43           | 69     | gn. m               | Do.                   |
| 2850       | Aug. 4   | 54 52 00                           | 159 46 00 | 51            | 48.2         | 21     | brk. sh             | Do.                   |
| 2851       | Aug. 4   | 54 55 00                           | 159 52 00 | 51            | 44.8         | 35     | gy. s. brk. sh      | Do.                   |
| 2852       | Aug. 4   | 55 15 00                           | 159 37 00 | 48            | 41.8         | 58     | bk. s               | Do.                   |
| 2853       | Aug. 9   | 56 00 00                           | 154 20 00 | 55            | 41           | 159    | gy. s               | Do.                   |
| 2854       | Aug. 10  | 56 55 00                           | 153 04 00 | 55            | 42.8         | 60     | bk. s               | Do.                   |
| 2855       | Aug. 10  | 57 00 00                           | 153 18 00 | 56            | 44           | 69     | gn. m               | Do.                   |
| 2856       | Aug. 22  | 58 07 00                           | 151 36 00 | 54            | 44           | 68     | gy. sh. bk. sp      | Do.                   |
| 2857       | Aug. 22  | 58 05 00                           | 150 46 00 | 57            | 44.6         | 51     | brk. sh. gy. s      | Do.                   |
| 2858       | Aug. 24  | 58 17 00                           | 148 36 00 | 59            | 39.8         | 230    | bu. m. g            | Do.                   |
|            |          | Sitka to Columbia River.           |           |               |              |        |                     |                       |
| 2859       | Aug. 29  | 55 20 00                           | 136 20 00 | 60            | 34.9         | 1,569  | gy. oz              | L. B. T.              |
| 2860       | Aug. 31  | 51 23 00                           | 130 34 00 | 58            | 36.5         | 876    | gn. m               | Do.                   |
| 2861       | Aug. 31  | 51 14 00                           | 129 50 00 | 60            | 42.6         | 204    | No specimen in cup. | Do.                   |
| 2862       | Sept. 1  | 50 49 00                           | 127 36 30 | 58            | 44.7         | 238    | gy. s. and p        | Do.                   |
| 2863       | Sept. 5  | 48 58 00                           | 123 10 00 | 62            | 48.5         | 67     | fne. s. brk. sp     | Do.                   |
| 2864       | Sept. 6  | 48 22 00                           | 122 51 00 | 52            | 47.7         | 48     | m. brk. sh. s       | Do.                   |
| 2865       | Sept. 6  | 48 12 00                           | 122 49 00 | 52            | 51.7         | 40     | p                   | Do.                   |
| 2866       | Sept. 20 | 48 09 00                           | 125 03 00 | 59            | 43.2         | 171    | gy. s               | Do.                   |
| 2867       | Sept. 20 | 48 07 00                           | 124 55 00 | 58            |              | 37     | fne. gy. s          | Do.                   |
| 2868       | Sept. 21 | 47 52 00                           | 124 44 00 | 58            | 46.9         | 31     | gy. s               | Do.                   |
| 2869       | Sept. 21 | 47 38 00                           | 124 39 00 | 60            | 48.4         | 32     | bk. s               | Do.                   |
| 2870       | Sept. 23 | 46 44 00                           | 124 32 00 | 58            | 46.5         | 58     | rky                 | Do.                   |
| 2871       | Sept. 23 | 46 55 00                           | 125 11 00 | 62            | 38.4         | 559    | br. oz              | Do.                   |
| 2872       | Sept. 24 | 48 17 00                           | 124 52 00 | 59            | 45.5         | 38     | gy. s               | Do.                   |
| 2873       | Sept. 24 | 48 30 00                           | 124 57 00 | 54            | 47.8         | 40     | r                   | Do.                   |
| 2874       | Sept. 24 | 48 30 00                           | 124 57 00 | 52            | 50.3         | 27     | r. and sh           | Tangles.              |
| 2875       | Sept. 24 | 48 30 00                           | 124 57 00 | 52            | 47.8         | 40     | r. and sh           | Do.                   |
| 2876       | Sept. 25 | 48 33 00                           | 124 53 00 | 49            | 45.5         | 59     | bk. s. and m        | L. B. T.              |
| 2877       | Sept. 25 | 48 33 00                           | 124 53 00 | 49            | 45.5         | 59     | bk. s. and m        | Tangles.              |
| 2878       | Sept. 25 | 48 37 00                           | 125 32 00 | 57            | 45.5         | 66     | p                   | S. D.                 |
| 2879       | Sept. 26 | 48 53 00                           | 125 53 00 | 54            | 50.3         | 34     | r                   | Do.                   |
| 2880       | Sept. 26 | 48 53 00                           | 125 53 00 | 54            | 50.3         | 34     | r                   | S. D.                 |
| 2881       | Sept. 26 | 49 00 00                           | 125 48 00 | 57            | 52.3         | 24     | gy. s               | Do.                   |
|            |          | Off Oregon.                        |           |               |              |        |                     |                       |
| 2882       | Oct. 13  | 46 09 00                           | 124 22 30 | 60            | 45.8         | 68     | gy. s               | L. B. T.              |
| 2883       | Oct. 18  | 45 56 00                           | 124 01 30 | 60            | 50.1         | 29     | fne. gy. s          | S. D.                 |
| 2884       | Oct. 18  | 45 55 00                           | 124 02 00 | 60            | 50.2         | 29     | fne. gy. s          | Do.                   |
| 2885       | Oct. 18  | 45 56 00                           | 124 02 00 | 60            | 49           | 30     | fne. gy. s          | Do.                   |
| 2886       | Oct. 19  | 43 59 00                           | 124 56 30 | 57            | 48.1         | 50     | rky                 | Do.                   |
| 2887       | Oct. 19  | 43 58 00                           | 124 57 00 | 59            | 47.1         | 42     | c. and p            | L. B. T.              |
| 2888       | Oct. 19  | 43 58 00                           | 124 57 30 | 59            | 47.6         | 41     | c. and p            | Do.                   |
| 2889       | Oct. 19  | 43 59 00                           | 124 56 00 | 57            | 47.7         | 46     | c. sh               | Do.                   |
| 2890       | Oct. 19  | 43 46 00                           | 124 57 00 | 59            | 42.2         | 277    | gy. s               | Do.                   |
|            |          | Off Southern California.           |           |               |              |        |                     |                       |
|            | 1889.    |                                    |           |               |              |        |                     |                       |
| 2891       | Jan. 5   | 34 25 00                           | 120 42 00 | 57            | 45.1         | 233    | m                   | L. B. T.              |
| 2892       | Jan. 5   | 34 15 00                           | 120 36 00 | 57            | 44.1         | 284    | yl. m               | Do.                   |
| 2893       | Jan. 5   | 34 12 30                           | 120 32 30 | 59            | 48.6         | 145    | fne. gy. s. m       | Do.                   |
| 2894       | Jan. 5   | 34 07 00                           | 120 33 30 | 60            | 55.6         | 53     | brk. sh. s          | S. D.                 |
| 2895       | Jan. 5   | 34 07 00                           | 120 33 30 | 60            |              | 53     | brk. sh. s          | Tangles.              |
| 2896       | Jan. 6   | 33 55 30                           | 120 28 00 | 59            | 42.8         | 376    | yl. m               | L. B. T.              |
| 2897       | Jan. 6   | 33 59 30                           | 120 29 30 | 61            | 47.1         | 197    | rky                 | Tangles.              |
| 2898       | Jan. 6   | 33 00 30                           | 120 29 00 | 61            |              | 158    |                     | L. B. T.              |
| 2899       | Jan. 6   | 34 00 00                           | 120 23 00 | 59            |              | 44     | gy. s. brk. sh      | Do.                   |
| 2900       | Jan. 7   | 34 01 30                           | 120 01 30 | 58            |              | 13     | s                   | S. D.                 |
| 2901       | Jan. 7   | 34 05 00                           | 120 02 00 | 58            | 55.1         | 48     | gy. s. m            |                       |
| 2902       | Jan. 7   | 34 06 00                           | 120 02 00 | 59            | 45.0         | 53     | fne. gy. s. m       | S. B. T.              |
| 2903       | Jan. 7   | 34 11 30                           | 120 03 00 | 59            | 43.5         | 322    | g. m                | L. B. T.              |
| 2904       | Jan. 7   | 34 18 30                           | 120 04 30 | 59            | 43.7         | 314    | g. m                | Do.                   |
| 2905       | Jan. 8   | 34 23 00                           | 120 20 00 | 59            |              | 95     | rky                 | S. B. T.              |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.               | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.        | Instrument used, etc. |
|--------------------------|---------|-----------|-----------|---------------|--------------|--------|------------------------|-----------------------|
|                          |         | Lat. N.   | Long. W.  |               |              |        |                        |                       |
| Off Southern California. |         |           |           |               |              |        |                        |                       |
| 1889.                    |         | ° ' "     | ° ' "     | ° F.          | ° F.         | Fms.   |                        |                       |
| 2906                     | Jan. 8  | 34 23 30  | 120 19 30 | 58            | 55.5         | 96     | s. m.                  | Tangles.              |
| 2907                     | Jan. 8  | 34 24 30  | 120 20 00 | 58            |              | 44     | fne. gy. s.            | L. B. T.              |
| 2908                     | Jan. 8  | 34 25 25  | 120 20 00 | 58            |              | 31     | gy. s. brk. sh.        | Do.                   |
| 2909                     | Jan. 8  | 34 22 00  | 120 08 30 | 59            | 45.2         | 205    | gn. m.                 | S. B. T.              |
| 2910                     | Jan. 8  | 34 20 00  | 119 54 00 | 61            | 45.2         | 229    | gn. m.                 | Do.                   |
| 2911                     | Jan. 16 | 32 27 30  | 119 05 00 | 59            |              | 60     | r. s.                  | S. D.                 |
| 2912                     | Jan. 16 | 32 25 15  | 119 04 30 | 59            |              | 10     | rky                    | Tangles.              |
| 2913                     | Jan. 16 | 32 25 30  | 119 03 30 | 60            | 59           | 26     | brk. sh.               | S. D.                 |
| 2914                     | Jan. 16 | 32 25 00  | 119 03 15 | 60            | 59           | 26     | brk. sh.               | Tangles.              |
| 2915                     | Jan. 16 | 32 23 30  | 119 02 15 | 60            | 53.1         | 55     | gy. s.                 | Do.                   |
| 2916                     | Jan. 16 | 32 22 30  | 119 02 00 | 60            | 49.1         | 98     | rky                    | L. B. T.              |
| 2917                     | Jan. 16 | 32 22 30  | 119 03 30 | 59            | 49.1         | 90     | fne. g. s. brk. sh.    | S. D.                 |
| 2918                     | Jan. 16 | 32 22 30  | 119 03 30 | 59            | 52.4         | 67     | fne. gy. s.            | Do.                   |
| 2919                     | Jan. 17 | 32 17 00  | 119 17 00 | 59            | 38           | 984    | gy. m.                 | L. B. T.              |
| 2920                     | Jan. 17 | 32 27 00  | 119 15 00 | 60            | 50.1         | 87     | yl. s. brk. sh.        | S. D. and tangles.    |
| 2921                     | Jan. 17 | 32 27 00  | 119 14 15 | 60            | 51.5         | 145    | fne. gy. s.            | S. D.                 |
| 2922                     | Jan. 17 | 32 27 15  | 119 05 15 | 50            | 57.1         | 47     | fne. gy. s.            | Do.                   |
| 2923                     | Jan. 19 | 32 40 30  | 117 31 30 | 59            | 39           | 822    | gn. m.                 | L. B. T.              |
| 2924                     | Jan. 19 | 32 34 30  | 117 25 30 | 59            | 40.5         | 455    | br. m.                 | Do.                   |
| 2925                     | Jan. 19 | 32 32 30  | 117 24 00 | 59            | 42.9         | 339    | m.                     | Do.                   |
| 2926                     | Jan. 19 | 32 34 30  | 117 18 45 | 62            | 54.4         | 69     | fne. gy. s.            | Do.                   |
| 2927                     | Jan. 23 | 32 43 00  | 117 51 00 | 58            | 43.3         | 313    | gn. m.                 | Do.                   |
| 2928                     | Jan. 23 | 32 47 30  | 118 10 00 | 59            | 41           | 417    | bk. s. g.              | Do.                   |
| 2929                     | Jan. 26 | 32 27 30  | 117 26 30 | 58            |              | 623    | gn. m.                 | S. B. T.              |
| 2930                     | Jan. 26 | 32 25 00  | 117 18 45 | 59            | 52.9         | 60     | m.                     | Do.                   |
| 2931                     | Jan. 26 | 32 25 30  | 117 16 45 | 59            | 55.9         | 34     | gy. s. sh.             | Do.                   |
| 2932                     | Jan. 26 | 32 26 15  | 117 16 15 | 59            | 58           | 20     | gy. s. brk. sh.        | Do.                   |
| 2933                     | Jan. 26 | 32 28 45  | 117 16 15 | 59            | 57.3         | 36     | fne. gy. s.            | S. D.                 |
| 2934                     | Jan. 26 | 32 33 30  | 117 16 00 | 59            | 58.2         | 36     | gy. s.                 | L. B. T.              |
| 2935                     | Feb. 4  | 32 44 30  | 117 23 00 | 59            | 49.2         | 124    | fne. gy. s.            | Do.                   |
| 2936                     | Feb. 4  | 32 49 00  | 117 27 30 | 61            | 49           | 359    | m.                     | Do.                   |
| 2937                     | Feb. 4  | 33 04 30  | 117 42 00 | 62            | 46.5         | 464    | gn. m.                 | Do.                   |
| 2938                     | Feb. 5  | 33 35 15  | 118 08 30 | 58            | 58           | 47     | fne. gy. s. st.        | Do.                   |
| 2939                     | Feb. 5  | 33 36 00  | 118 09 30 | 59            |              | 27     | fne. gy. s. st.        | Do.                   |
| 2940                     | Feb. 5  | 33 36 00  | 118 11 00 | 59            |              | 26     | fne. gy. s. brk. sh.   | Do.                   |
| 2941                     | Feb. 5  | 33 37 15  | 118 12 00 | 59            |              | 26     | sh. st.                | Do.                   |
| 2942                     | Feb. 5  | 33 38 45  | 118 13 45 | 59            |              | 20     | gy. s. brk. sh.        | Do.                   |
| 2943                     | Feb. 6  | 34 00 30  | 119 28 30 | 59            | 56           | 31     | rky                    | S. D.                 |
| 2944                     | Feb. 6  | 34 00 00  | 119 28 30 | 59            |              | 30     | rky                    | S. B. T.              |
| 2945                     | Feb. 6  | 34 00 00  | 119 29 30 | 59            |              | 30     | p.                     | Do.                   |
| 2946                     | Feb. 6  | 33 58 00  | 119 30 45 | 59            | 56.5         | 150    | crs. gy. s.            | L. B. T.              |
| 2947                     | Feb. 7  | 33 55 30  | 119 40 30 | 59            |              | 269    | gy. s. g. brk. sh.     | Do.                   |
| 2948                     | Feb. 7  | 33 55 30  | 119 41 30 | 59            |              | 266    | gy. s. g. brk. sh.     | Do.                   |
| 2949                     | Feb. 7  | 33 57 00  | 119 53 30 | 58            |              | 155    | fne. gy. s.            | Do.                   |
| 2950                     | Feb. 8  | 34 00 30  | 119 59 00 | 57            | 55.4         | 21     | gy. s. brk. sh.        | Do.                   |
| 2951                     | Feb. 8  | 33 55 30  | 119 55 00 | 56            |              | 48     | fne. gy. s.            | Do.                   |
| 2952                     | Feb. 8  | 33 50 00  | 119 57 00 | 57            |              | 57     | brk. sh. r.            | Do.                   |
| 2953                     | Feb. 8  | 33 47 00  | 119 58 15 | 57            |              | 82     | gy. s. brk. sh.        | S. D.                 |
| 2954                     | Feb. 8  | 33 42 30  | 119 59 30 | 57            |              | 65     | g. sh. r.              | Do.                   |
| 2955                     | Feb. 8  | 33 48 00  | 120 03 15 | 59            | 48.2         | 121    | fne. gy. s. brk. sh.   | S. B. T.              |
| 2956                     | Feb. 8  | 33 57 30  | 120 18 30 | 58            | 53.1         | 52     | fne. gy. s. r.         | Do.                   |
| 2957                     | Feb. 9  | 34 04 00  | 120 19 30 | 58            | 54.9         | 26     | gy. s. rky             | S. D.                 |
| 2958                     | Feb. 9  | 34 04 00  | 120 19 30 | 58            | 54.9         | 26     | gy. s.                 | Tangles.              |
| 2959                     | Feb. 9  | 34 06 45  | 120 18 00 | 59            | 51.9         | 55     | gn. m. gy. s. brk. sh. | L. B. T.              |
| 2960                     | Feb. 9  | 34 10 45  | 120 16 45 | 59            | 48           | 267    | gn. m.                 | Do.                   |
| 2961                     | Feb. 11 | 34 22 45  | 119 40 30 | 58            |              | 21     | gn. m.                 | Do.                   |
| 2962                     | Feb. 11 | 34 23 30  | 119 39 30 | 59            |              | 165    | s. st. co.             | Do.                   |
| 2963                     | Feb. 11 | 34 23 10  | 119 39 40 | 59            |              | 20     | s. st. co.             | Tangles.              |
| 2964                     | Feb. 11 | 34 22 45  | 119 40 00 | 59            |              | 21.5   | s. st.                 | Do.                   |
| 2965                     | Feb. 11 | 34 21 20  | 119 36 30 | 60            | 58           | 27     | fne. gy. s. r.         | Do.                   |
| 2966                     | Feb. 11 | 34 20 40  | 119 38 50 | 60            | 58.5         | 30     | crs. m.                | Do.                   |
| 2967                     | Feb. 11 | 34 21 15  | 119 39 10 | 60            | 58           | 30     | crs. m.                | Do.                   |
| 2968                     | Feb. 11 | 34 21 40  | 119 38 20 | 61            | 59           | 31     | m.                     | Do.                   |
| 2969                     | Feb. 11 | 34 20 40  | 119 37 45 | 61            | 58           | 26     | gy. s. p. st.          | Do.                   |
| 2970                     | Feb. 11 | 34 20 20  | 119 37 30 | 61            | 59.1         | 29     | fne. gy. s. m.         | L. B. T.              |
| 2971                     | Feb. 11 | 34 20 30  | 119 37 50 | 60            | 58.5         | 29     | fne. gy. s. m.         | Do.                   |
| 2972                     | Feb. 11 | 34 18 30  | 119 41 00 | 60            | 53.5         | 61     | gn. m.                 | Do.                   |
| 2973                     | Feb. 11 | 34 19 30  | 119 44 15 | 60            | 54           | 68     | gn. m.                 | Do.                   |
| 2974                     | Feb. 11 | 34 19 30  | 119 44 45 | 60            | 53.2         | 73     | gn. m.                 | Tangles.              |
| 2975                     | Feb. 12 | 34 01 30  | 119 29 00 | 60            | 57           | 36     | g. brk. sh.            | L. B. T.              |
| 2976                     | Feb. 12 | 34 00 00  | 119 26 30 | 60            | 58           | 31     | crs. g. s. brk. sh.    | S. B. T.              |
| 2977                     | Feb. 12 | 33 59 30  | 119 25 30 | 60            | 56.5         | 45     | fne. gy. s. p.         | Do.                   |
| 2978                     | Feb. 12 | 33 59 45  | 119 22 15 | 60            | 56.5         | 46     | gy. s.                 | Do.                   |
| 2979                     | Feb. 12 | 33 56 30  | 119 22 30 | 60            |              | 388    | gn. m.                 | L. B. T.              |
| 2980                     | Feb. 12 | 33 49 45  | 119 24 30 | 62            | 38.9         | 603    | gn. m.                 | Do.                   |
| 2981                     | Feb. 13 | 33 18 00  | 119 24 00 | 58            |              | 45     | crs. gy. s. brk. sh.   | Do.                   |
| 2982                     | Feb. 13 | 33 24 45  | 119 07 00 | 58            | 46.7         | 178    | s. m. g.               | Do.                   |



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                 | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.      | Instrument used, etc. |
|----------------------------|---------|-----------|-----------|---------------|--------------|--------|----------------------|-----------------------|
|                            |         | Lat. N.   | Long. W.  |               |              |        |                      |                       |
| Off Lower California.      |         |           |           |               |              |        |                      |                       |
|                            | 1889.   | ° ' "     | ° ' "     | ° F.          | ° F.         | Fms.   |                      |                       |
| 2983                       | Feb. 28 | 28 58 30  | 118 15 45 | 61            | 55.8         | 58     | gy. s. brk. sh.      | S. B. T.              |
| 2984                       | Feb. 28 | 28 57 15  | 118 15 45 | 63            | 49.8         | 113    | gy. s. brk. sh.      | Do.                   |
| 2985                       | Feb. 28 | 28 57 00  | 118 16 30 | 65            |              | 36     | brk. sh. r.          | Do.                   |
| 2986                       | Feb. 28 | 28 57 00  | 118 14 30 | 64            | 38.5         | 684    | fne. gy. s. brk. sh. | L. B. T.              |
| 2987                       | Feb. 28 | 28 54 15  | 118 18 00 | 63            | 46.3         | 171    | gy. s. bk. sp. g.    | S. B. T.              |
| 2988                       | Mar. 2  | 24 58 30  | 115 52 30 | 65            | 63.9         | 34     | coralline.           | Tangles.              |
| 2989                       | Mar. 2  | 24 58 15  | 115 53 00 | 64.5          | 64.3         | 36     | coralline.           | S. D.                 |
| 2990                       | Mar. 2  | 24 58 05  | 115 53 10 | 65            | 63.6         | 48     | coralline.           | S. B. T.              |
| Revillagigedo Islands.     |         |           |           |               |              |        |                      |                       |
| 2991                       | Mar. 6  | 18 18 30  | 114 40 00 | 72            |              | 341    |                      | L. B. T.              |
| 2992                       | Mar. 6  | 18 17 30  | 114 43 15 | 72            | 41.8         | 460    | bk. s. r.            | Do.                   |
| 2993                       | Mar. 6  | 18 17 15  | 114 44 30 | 72            | 43.5         | 364    | gy. s. brk. sh.      | Do.                   |
| 2994                       | Mar. 6  | 18 18 30  | 114 44 30 | 72            | 66.6         | 54     | brk. co.             | S. D.                 |
| 2995                       | Mar. 6  | 18 19 00  | 116 44 15 | 72            | 68.4         | 31     | gy. s. brk. co.      | Do.                   |
| Gulf of California.        |         |           |           |               |              |        |                      |                       |
| 2996                       | Mar. 16 | 24 30 15  | 110 29 00 | 72            | 56           | 112    | gn. m.               | L. B. T.              |
| 2997                       | Mar. 16 | 24 39 30  | 110 34 00 | 73            | 49.5         | 221    | gn. m.               | Do.                   |
| 2998                       | Mar. 16 | 24 51 00  | 110 39 00 | 72            | 64           | 40     | s. brk. sh.          | Do.                   |
| 2999                       | Mar. 16 | 24 54 30  | 110 39 00 | 72            | 63.6         | 39     | crs. s.              | Do.                   |
| 3000                       | Mar. 16 | 24 54 45  | 110 39 30 | 72            | 61.5         | 43     | crs. s.              | Oyster dredge.        |
| 3001                       | Mar. 16 | 24 55 15  | 110 39 00 | 72            | 64.5         | 33     | fne. gy. s. brk. sh. | Do.                   |
| 3002                       | Mar. 17 | 25 02 15  | 110 43 30 | 70            |              | 17     | s. sh.               | Do.                   |
| 3003                       | Mar. 17 | 25 02 25  | 110 43 30 | 70            |              | 9      | s. sh.               | Do.                   |
| 3004                       | Mar. 17 | 25 02 35  | 110 43 30 | 70            |              | 7.5    | s. sh.               | L. B. T.              |
| 3005                       | Mar. 17 | 25 02 45  | 110 43 30 | 71            |              | 21     | s. sh. coralline     | Do.                   |
| 3006                       | Mar. 17 | 25 02 30  | 110 43 30 | 75            |              | 8      | shs.                 | Do.                   |
| 3007                       | Mar. 17 | 25 27 30  | 110 50 30 | 69            | 44.6         | 362    | gn. m.               | Do.                   |
| 3008                       | Mar. 18 | 25 59 45  | 111 03 30 | 67            | 46           | 306    | m.                   | Do.                   |
| 3009                       | Mar. 20 | 27 09 00  | 111 42 00 | 66            | 37.7         | 857    | gn. m.               | Do.                   |
| 3010                       | Mar. 20 | 27 23 45  | 111 25 00 | 71            | 37.6         | 1,005  | gn. m.               | Do.                   |
| 3011                       | Mar. 23 | 28 07 00  | 111 39 45 | 69            | 57.9         | 71     | fne. gy. s. brk. sh. | Do.                   |
| 3012                       | Mar. 23 | 28 16 00  | 111 54 00 | 69            | 63           | 22     | fne. gy. s.          | Do.                   |
| 3013                       | Mar. 23 | 28 23 45  | 111 58 00 | 66            | 65           | 14     | gy. s. brk. sh.      | Do.                   |
| 3014                       | Mar. 23 | 28 28 00  | 112 04 30 | 66            | 62.9         | 29     | gy. s.               | Do.                   |
| 3015                       | Mar. 24 | 29 19 00  | 112 50 00 | 63            | 54.9         | 145    | br. m.               | Do.                   |
| 3016                       | Mar. 24 | 29 40 00  | 112 57 00 | 65            | 59           | 76     | gn. m.               | Do.                   |
| 3017                       | Mar. 24 | 29 54 30  | 113 01 00 | 66.5          | 61.8         | 58     | gn. m.               | Do.                   |
| 3018                       | Mar. 24 | 30 16 00  | 113 05 00 | 66            | 63.3         | 36     | gy. s. brk. sh.      | Do.                   |
| 3019                       | Mar. 24 | 30 28 00  | 113 06 30 | 66            | 66           | 14     | bk. s. brk. sh.      | Do.                   |
| 3020                       | Mar. 24 | 30 37 30  | 113 07 00 | 65            |              | 7      | gy. s. bk. sp.       | Do.                   |
| 3021                       | Mar. 24 | 30 47 00  | 113 13 00 | 65            |              | 14     | gy. s. brk. sh.      | Do.                   |
| 3022                       | Mar. 24 | 30 58 30  | 113 17 15 | 66.1          | 66.1         | 11     | gy. s. bk. sp.       | Do.                   |
| 3023                       | Mar. 25 | 31 17 30  | 113 57 15 | 67            |              | 10     | g. sh.               | Do.                   |
| 3024                       | Mar. 25 | 31 21 00  | 113 49 00 | 67            | 67           | 11     | s. brk. sh. g.       | Do.                   |
| 3025                       | Mar. 25 | 31 21 15  | 113 59 00 | 67            | 66.1         | 9.5    | fne. gy. s.          | Do.                   |
| 3026                       | Mar. 25 | 31 22 00  | 114 07 45 | 66            | 65.2         | 17     | g. brk. sh.          | Do.                   |
| 3027                       | Mar. 26 | 31 31 45  | 114 19 00 | 68            |              | 10     | gy. s.               | Do.                   |
| 3028                       | Mar. 26 | 31 32 30  | 114 20 00 | 68            |              | 9.75   | s.                   | Do.                   |
| 3029                       | Mar. 26 | 31 33 00  | 114 20 30 | 68            |              | 10.5   | fne. gy. s. brk. sh. | Do.                   |
| 3030                       | Mar. 27 | 31 07 00  | 114 29 00 | 65            | 64           | 20     | m.                   | Do.                   |
| 3031                       | Mar. 27 | 31 06 45  | 114 28 15 | 65            | 63.8         | 33     | bn. m.               | Do.                   |
| 3032                       | Mar. 27 | 31 05 30  | 114 29 00 | 65            |              | 12     | gy. s.               | Do.                   |
| 3033                       | Mar. 27 | 30 50 45  | 114 29 45 | 65.7          | 63.5         | 18     | gy. m.               | Do.                   |
| 3034                       | Mar. 27 | 30 36 30  | 114 27 45 | 69.5          | 63.5         | 24     | gy. m.               | Do.                   |
| 3035                       | Mar. 27 | 30 21 00  | 114 25 15 | 70            | 62           | 30     | gy. m.               | Do.                   |
| 3036                       | Mar. 29 | 29 47 15  | 114 24 00 | 67            |              | 5      | m. s. brk. sh.       | Do.                   |
| 3037                       | Mar. 31 | 27 45 00  | 110 45 00 | 69            | 65.2         | 20     | gn. m.               | Do.                   |
| Off Lower California.      |         |           |           |               |              |        |                      |                       |
| 3038                       | Apr. 8  | 24 24 30  | 111 53 00 | 67            | 65.5         | 31     | gy. s. brk. sh.      | L. B. T.              |
| 3039                       | Apr. 8  | 24 27 00  | 111 59 00 | 67            | 68.5         | 47     | fne. yl. s.          | Do.                   |
| 3040                       | Apr. 9  | 24 35 00  | 112 04 30 | 68            |              | 21     | s. sh.               | Oyster dredge.        |
| 3041                       | Apr. 9  | 24 35 30  | 112 05 00 | 68            | 64.5         | 27     | fne. gy. s.          | L. B. T.              |
| 3042                       | Apr. 9  | 24 34 00  | 112 05 30 | 67            | 65           | 17     | fne. gy. s.          | Do.                   |
| 3043                       | Apr. 10 | 26 07 00  | 113 32 00 | 64            | 55           | 74     | fne. gy. s.          | Do.                   |
| 3044                       | Apr. 10 | 26 16 15  | 113 42 15 | 64            | 56           | 58     | gy. s. brk. sh.      | Do.                   |
| 3045                       | Apr. 10 | 26 24 00  | 113 49 00 | 65            | 48           | 184    | m.                   | Do.                   |
| Off Oregon and Washington. |         |           |           |               |              |        |                      |                       |
| 3046                       | June 7  | 46 48 30  | 124 28 00 | 56            | 46.1         | 48     | fne. gy. s.          | L. B. T.              |
| 3047                       | June 7  | 46 47 00  | 124 30 15 | 57            | 45.9         | 50     | fne. gy. s.          | Do.                   |
| 3048                       | June 7  | 46 45 30  | 124 33 00 | 57            | 41.1         | 52     | rky.                 | Do.                   |
| 3049                       | June 7  | 46 31 00  | 124 22 00 | 57            | 46.7         | 43     | fne. blk. s.         | Do.                   |
| 3050                       | June 8  | 44 01 15  | 124 57 00 | 54            | 51.1         | 46     | co. brk. sh.         | Do.                   |



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                 | Date.    | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.    | Instrument used, etc. |
|----------------------------|----------|-----------|-----------|---------------|--------------|--------|--------------------|-----------------------|
|                            |          | Lat. N.   | Long. W.  |               |              |        |                    |                       |
| Off Oregon and Washington. |          |           |           |               |              |        |                    |                       |
| 1889.                      |          |           |           |               |              |        |                    |                       |
| 3051                       | June 8   | 43 59 15  | 124 58 30 | 55            |              | 59     | co. brk. sh. rky   | Tangles.              |
| 3052                       | June 8   | 44 00 00  | 124 57 00 | 55            | 49           | 48     | co. brk. sh. rky   | Do.                   |
| 3053                       | June 8   | 44 04 30  | 124 50 00 | 56            | 47.3         | 64     | co. brk. sh. rky   | Do.                   |
| 3054                       | June 8   | 44 13 00  | 124 44 30 | 56            | 48           | 53     | r                  | Do.                   |
| 3055                       | June 9   | 44 41 30  | 124 09 15 | 57            | 47.4         | 28     | fne. gy. s.        | L. B. T.              |
| 3056                       | June 9   | 44 41 30  | 124 09 15 | 57            | 47.4         | 28     | fne. gy. s.        | Do.                   |
| 3057                       | June 9   | 44 43 31  | 124 15 45 | 52            | 45.7         | 43     | crs. gy. s.        | Do.                   |
| 3058                       | June 9   | 44 48 00  | 124 10 00 | 53            | 45.8         | 38     | crs. gy. s. sh.    | Do.                   |
| 3059                       | June 9   | 44 56 00  | 124 12 30 | 53            | 45.1         | 77     | m                  | Do.                   |
| 3060                       | June 13  | 45 56 15  | 124 01 30 | 53            |              | 28     | br. m              | Do.                   |
| 3061                       | June 13  | 45 55 30  | 124 01 00 | 53            | 48.4         | 23     | fne. blk. s.       | Do.                   |
| 3062                       | June 13  | 46 55 45  | 124 05 00 | 54            | 45.2         | 44     | fne. blk. s.       | Do.                   |
| 3063                       | June 13  | 46 55 15  | 124 04 30 | 54            | 45.8         | 42     | fne. gy. s.        | Do.                   |
| 3064                       | June 13  | 46 03 15  | 124 09 00 | 58            | 45.6         | 46     | fne. gy. s. g      | Do.                   |
| 3065                       | June 13  | 46 14 30  | 124 13 00 | 57            |              | 27     | fne. bk. s.        | Do.                   |
| 3066                       | June 13  | 46 26 30  | 124 26 00 | 57            | 45.6         | 55     | s. m               | Do.                   |
| 3067                       | June 18  | 47 36 00  | 122 23 15 | 56            |              | 82     | gn. m              | Do.                   |
| 3068                       | June 18  | 47 35 30  | 122 27 00 | 58            |              | 135    | gn. m              | Do.                   |
| 3069                       | June 28  | 47 25 30  | 125 42 00 | 56            | 37.6         | 760    | gn. m              | Do.                   |
| 3070                       | June 28  | 47 29 30  | 125 43 00 | 57            | 37.9         | 636    | gn. m              | Do.                   |
| 3071                       | June 28  | 47 29 00  | 125 33 30 | 55            | 38           | 685    | gn. m              | Do.                   |
| 3072                       | June 28  | 47 28 30  | 125 24 00 | 55            | 38.2         | 584    | gn. m              | S. B. T.              |
| 3073                       | June 28  | 47 28 00  | 125 15 00 | 55            | 49.2         | 477    | gn. m              | Do.                   |
| 3074                       | June 29  | 47 22 00  | 125 48 30 | 54            | 36.6         | 877    | gn. m              | L. B. T.              |
| 3075                       | June 29  | 47 22 00  | 125 41 00 | 57            | 36.6         | 859    | gn. m              | Do.                   |
| 3076                       | June 29  | 47 46 00  | 125 10 00 | 59            | 43.4         | 178    | gn. m              | Do.                   |
| Southeast Alaska.          |          |           |           |               |              |        |                    |                       |
| 3077                       | July 23  | 55 46 00  | 132 24 00 | 60            | 42.4         | 322    | gn. m. g           | L. B. T.              |
| Off Oregon.                |          |           |           |               |              |        |                    |                       |
| 3078                       | Sept. 1  | 43 59 15  | 124 46 00 | 60            | 45.7         | 68     | g. m               | S. B. T.              |
| 3079                       | Sept. 1  | 43 59 15  | 124 44 40 | 59            | 46.7         | 55     | rky                | Tangles.              |
| 3080                       | Sept. 1  | 43 58 00  | 124 35 00 | 60            | 45.6         | 93     | gn. m              | L. B. T.              |
| 3081                       | Sept. 1  | 43 59 00  | 124 20 00 | 58            | 45.8         | 61     | gn. m. s           | Do.                   |
| 3082                       | Sept. 2  | 43 52 00  | 124 15 00 | 57            | 46.2         | 43     | fne. gy. s         | Do.                   |
| 3083                       | Sept. 2  | 43 59 00  | 124 14 30 | 56            | 47.8         | 32     | fne. gy. s. bk. sp | Do.                   |
| 3084                       | Sept. 2  | 44 12 30  | 124 19 00 | 58            | 46.9         | 46     | fne. gy. s. bk. sp | Do.                   |
| 3085                       | Sept. 2  | 44 29 30  | 124 17 00 | 56            | 45.7         | 42     | fne. gy. s         | L. B. T.              |
| 3086                       | Sept. 3  | 44 36 00  | 124 18 30 | 54            | 46.2         | 46     | fne. gy. s. bk. sp | Do.                   |
| 3087                       | Sept. 3  | 44 28 00  | 124 26 00 | 56            | 45.9         | 46     | c. and p           | Tangles.              |
| 3088                       | Sept. 3  | 44 28 00  | 124 25 30 | 56            | 46.3         | 46     | c. p               | S. B. T.              |
| 3089                       | Sept. 7  | 45 40 30  | 123 58 45 | 56            |              | 20     | fne. gy. s         | L. B. T.              |
| 3090                       | Sept. 7  | 45 43 00  | 124 12 00 | 57            | 45.8         | 62     | fne. gy. s         | Do.                   |
| 3091                       | Sept. 8  | 45 32 00  | 124 19 30 | 56            |              | 87     | gn. m              | Do.                   |
| 3092                       | Sept. 8  | 45 31 15  | 124 05 00 | 56            | 45.9         | 46     | bk. s              | Do.                   |
| 3093                       | Sept. 8  | 45 20 30  | 124 06 30 | 50            | 44.9         | 57     | fne. gy. s         | Do.                   |
| 3094                       | Sept. 12 | 43 01 00  | 124 30 30 | 48            | 46.7         | 35     | crs. s. sh         | S. Dr.                |
| 3095                       | Sept. 12 | 42 44 45  | 124 38 10 | 48            | 47.0         | 42     | r. st. brk. sh     | Tangles.              |
| 3096                       | Sept. 12 | 42 45 00  | 124 36 15 | 48            | 46.7         | 33     | st. brk. sh        | Do.                   |
| Off Central California.    |          |           |           |               |              |        |                    |                       |
| 1890.                      |          |           |           |               |              |        |                    |                       |
| 3097                       | Mar. 5   | 37 59 08  | 122 25 45 | 51            |              | 12     | bu. m              | L. B. T.              |
| 3098                       | Mar. 5   | 37 58 25  | 122 26 30 | 51            |              | 13     | bu. m              | Do.                   |
| 3099                       | Mar. 10  | 37 44 50  | 122 43 00 | 51            | 50.8         | 20     | fne. gy. s.        | Do.                   |
| 3100                       | Mar. 10  | 37 43 20  | 122 43 00 | 51            | 50.4         | 29     | cra. g             | Do.                   |
| 3101                       | Mar. 10  | 37 42 00  | 122 53 20 | 51            | 50.8         | 33     | yl. s              | Do.                   |
| 3102                       | Mar. 10  | 37 40 40  | 122 59 00 | 51            | 51.8         | 27     | c. brk. sh.        | Do.                   |
| 3103                       | Mar. 10  | 37 38 00  | 123 02 30 | 49            | 57.9         | 67     | fne. dk. s.        | Do.                   |
| 3104                       | Mar. 11  | 37 23 00  | 123 08 00 | 49            | 40.8         | 391    | c                  | Do.                   |
| 3105                       | Mar. 11  | 37 21 00  | 123 00 00 | 51            | 44.2         | 217    | fne. gy. s.        | Do.                   |
| 3106                       | Mar. 11  | 37 21 00  | 122 51 00 | 51            |              | 77     | fne. gy. s.        | Do.                   |
| 3107                       | Mar. 11  | 37 20 00  | 122 44 00 | 52            |              | 51     | fne. gy. s.        | Do.                   |
| 3108                       | Mar. 11  | 37 19 00  | 122 36 00 | 53            | 50.8         | 43     | r. brk. sh.        | Do.                   |
| 3109                       | Mar. 11  | 37 18 30  | 122 35 00 | 53            | 50.8         | 40     | rky                | Tangles.              |
| 3110                       | Mar. 11  | 37 19 00  | 122 32 00 | 53            | 51.0         | 39     | rky                | Do.                   |
| 3111                       | Mar. 11  | 37 13 30  | 122 26 00 | 53            | 52.8         | 20     | gy. s              | Do.                   |
| 3112                       | Mar. 12  | 37 08 00  | 122 47 00 | 52            | 41.8         | 296    | fne. gy. s.        | L. B. T.              |
| 3113                       | Mar. 12  | 37 06 40  | 122 37 30 | 52            | 48.8         | 70     | fne. gy. s.        | Do.                   |
| 3114                       | Mar. 12  | 37 06 00  | 122 32 00 | 52            |              | 62     | m                  | Do.                   |
| 3115                       | Mar. 12  | 37 05 00  | 122 24 00 | 52            |              | 43     | fne. bk. s.        | Do.                   |
| 3116                       | Mar. 12  | 37 05 30  | 122 19 00 | 54            |              | 16     | rky                | S. Dr.                |
| 3117                       | Mar. 12  | 37 04 20  | 122 18 20 | 52            | 50.7         | 43     | bk. s. m.          | L. B. T.              |
| 3118                       | Mar. 12  | 36 57 10  | 122 18 00 | 55            | 50.9         | 54     | rky. co.           | S. Dr.                |
| 3119                       | Mar. 12  | 36 56 30  | 122 17 40 | 55            | 50.9         | 54     | rky. co.           | Tangles.              |
| 3120                       | Mar. 12  | 36 55 40  | 122 15 10 | 54            | 49.7         | 54     | gn. m. s. r.       | Do.                   |
| 3121                       | Mar. 12  | 36 57 20  | 122 15 00 | 53            | 49.8         | 48     | gn. m. s.          | Do.                   |
| 3122                       | Mar. 12  | 36 59 00  | 122 15 00 | 52            | 52.3         | 38     | gy. s. m.          | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No. | Date.   | Position.               |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom. | Instrument used, etc. |
|------------|---------|-------------------------|-----------|---------------|--------------|--------|-----------------|-----------------------|
|            |         | Lat. N.                 | Long. W.  |               |              |        |                 |                       |
|            |         | Off Central California. |           |               |              |        |                 |                       |
|            | 1890.   | ° ' "                   | ° ' "     | ° F.          | ° F.         | Fms.   |                 |                       |
| 3123       | Mar. 12 | 36 57 00                | 122 10 00 | 54            | 52.8         | 37     | fne. gy. s. m.  | Tangles.              |
| 3124       | Mar. 13 | 36 55 10                | 122 04 00 | 51            | 52.3         | 21     | rky             | L. B. T.              |
| 3125       | Mar. 13 | 36 52 00                | 122 11 00 | 52            | 48.4         | 65     | fne. gy. s. sh. | L. B. T. and mud bag. |
| 3126       | Mar. 13 | 36 49 20                | 122 12 30 | 53            | 52.8         | 456    | gn. m.          | L. B. T.              |
| 3127       | Mar. 13 | 36 45 00                | 122 10 20 | 53            | 40.5         | 418    | gn. m. s.       | L. B. T. and mud bag. |
| 3128       | Mar. 13 | 36 41 50                | 122 07 30 | 53            | 38.9         | 627    | bu. m.          | Do.                   |
| 3129       | Mar. 13 | 36 39 40                | 122 01 00 | 57            | 43.7         | 204    | s. and m.       | Do.                   |
| 3130       | Mar. 14 | 36 36 40                | 121 53 00 | 58            | -----        | 9      | s.              | S. B. T.              |
| 3131       | Mar. 14 | 36 41 30                | 121 54 10 | 58            | 50.8         | 48     | br. m. r.       | Do.                   |
| 3132       | Mar. 14 | 36 44 00                | 121 51 00 | 55            | 52.1         | 33     | br. m.          | Do.                   |
| 3133       | Mar. 14 | 36 47 50                | 121 49 00 | 55            | 52.3         | 37     | br. m.          | Do.                   |
| 3134       | Mar. 14 | 36 51 40                | 121 51 20 | 54            | 54.5         | 13     | fne. s. m.      | L. B. T.              |
| 3135       | Mar. 14 | 36 54 10                | 121 55 00 | 54            | 54.7         | 15     | fne. gy. s.     | Do.                   |
| 3136       | Mar. 15 | 36 57 00                | 122 01 00 | 52            | -----        | 7      | gy. s.          | S. B. T.              |
| 3137       | Mar. 15 | 36 56 00                | 122 01 20 | 52            | -----        | 11     | s. p.           | Do.                   |
| 3138       | Mar. 15 | 36 55 30                | 122 02 00 | 52            | 55.4         | 19     | fne. s. m. st.  | S. Dr.                |
| 3139       | Mar. 15 | 36 54 10                | 122 03 00 | 52            | 52.9         | 27     | gn. m.          | Do.                   |
| 3140       | Mar. 15 | 36 54 30                | 122 05 00 | 52            | 52.3         | 30     | m.              | Do.                   |
| 3141       | Mar. 15 | 36 56 00                | 122 06 00 | 52            | 53           | 24     | fne. gy. s. m.  | Do.                   |
| 3142       | Mar. 15 | 36 56 20                | 122 03 20 | 52            | -----        | 13     | fne. s. rky.    | Do.                   |
| 3143       | Mar. 15 | 36 56 10                | 122 02 40 | 53            | -----        | 9      | rky.            | Do.                   |
| 3144       | Mar. 15 | 36 55 40                | 122 03 10 | 54            | -----        | 20     | s. g. r. m.     | Do.                   |
| 3145       | Mar. 15 | 36 51 05                | 122 05 30 | 54            | 49.5         | 56     | fne. gy. s.     | L. B. T.              |
| 3146       | Mar. 15 | 36 53 30                | 122 12 00 | 54            | 49.5         | 62     | gn. m. r.       | S. B. T.              |
| 3147       | Mar. 15 | 37 00 00                | 122 20 00 | 55            | 49.2         | 56     | br. m.          | Do.                   |
| 3148       | Mar. 15 | 37 08 00                | 122 28 10 | 54            | 51.3         | 47     | br. m.          | Do.                   |
| 3149       | Mar. 15 | 37 13 50                | 122 32 30 | 54            | 51.1         | 45     | gn. m.          | Do.                   |
| 3150       | Mar. 21 | 37 47 00                | 122 44 10 | 55            | 52.3         | 21     | fne. gy. s.     | L. B. T.              |
| 3151       | Mar. 21 | 37 49 00                | 122 55 30 | 55            | 51.6         | 37     | crs. s. rd. sp. | Do.                   |
| 3152       | Mar. 21 | 37 53 30                | 122 56 30 | 55            | 50.6         | 36     | fne. gy. s.     | Do.                   |
| 3153       | Mar. 21 | 37 57 10                | 122 56 20 | 52            | 51.3         | 32     | gn. m.          | Do.                   |
| 3154       | Mar. 21 | 37 59 20                | 122 55 30 | 52            | 51.8         | 20     | bk. s. m.       | Do.                   |
| 3155       | Mar. 22 | 37 57 30                | 122 59 00 | 52            | -----        | 35     | gn. m.          | Do.                   |
| 3156       | Mar. 22 | 37 53 30                | 123 04 00 | 52            | 45.3         | 50     | s.              | Do.                   |
| 3157       | Mar. 22 | 37 49 30                | 123 06 00 | 53            | 50.6         | 47     | fne. gy. s.     | T. B. T.              |
| 3158       | Mar. 22 | 37 47 30                | 123 10 40 | 53            | 51.4         | 29     | rky.            | Tangles.              |
| 3159       | Mar. 22 | 37 47 20                | 123 10 00 | 53            | -----        | 27     | rky.            | Do.                   |
| 3160       | Mar. 22 | 37 48 35                | 123 12 40 | 52            | 51.8         | 39     | rky.            | Do.                   |
| 3161       | Mar. 22 | 37 49 30                | 123 23 40 | 52            | 44.5         | 191    | fne. gy. s.     | L. B. T. and mud bag. |
| 3162       | Mar. 22 | 37 54 10                | 123 30 00 | 53            | 39           | 552    | gn. m.          | L. B. T.              |
| 3163       | Mar. 22 | 37 56 40                | 123 25 30 | 52            | 48.5         | 69     | fne. gy. s.     | Do.                   |
| 3164       | Mar. 23 | 37 59 40                | 123 14 25 | 50            | 48.5         | 61     | rky.            | S. Dr.                |
| 3165       | Mar. 23 | 37 59 45                | 123 08 35 | 50            | 49           | 50     | gn. m.          | Do.                   |
| 3166       | Mar. 23 | 37 57 30                | 123 04 30 | 52            | 50.3         | 47     | gn. m.          | S. B. T.              |
| 3167       | Mar. 23 | 37 57 30                | 122 59 30 | 52            | 49.5         | 33     | gn. m.          | Do.                   |
| 3168       | Mar. 24 | 38 01 25                | 123 26 55 | 52            | -----        | 34     | rky. co.        | Tangles.              |
| 3169       | Mar. 28 | 38 16 30                | 123 30 00 | 52            | 44           | 202    | m.              | L. B. T.              |
| 3170       | Mar. 28 | 38 17 00                | 123 29 00 | 52            | -----        | 167    | m.              | Do.                   |
| 3171       | Mar. 28 | 38 20 30                | 123 20 00 | 52            | 48           | 76     | rky. s.         | Do.                   |
| 3172       | Mar. 28 | 38 23 35                | 123 14 00 | 52            | 48           | 62     | bk. s.          | Do.                   |
| 3173       | Mar. 28 | 38 19 25                | 123 14 30 | 52            | 48.2         | 62     | m.              | S. B. T. and mud bag. |
| 3174       | Mar. 28 | 38 15 40                | 123 14 15 | 53            | 49.5         | 65     | gn. m.          | L. B. T.              |
| 3175       | Mar. 29 | 38 07 35                | 123 13 30 | 49            | -----        | 57     | br. m.          | Do.                   |
| 3176       | Mar. 29 | 38 01 30                | 123 06 00 | 49            | -----        | 37     | gy. s.          | Do.                   |
| 3177       | Mar. 29 | 37 59 30                | 123 03 05 | 50            | -----        | 25     | crs. s. g.      | S. B. T.              |
| 3178       | Mar. 29 | 37 57 00                | 122 57 25 | 50            | 49           | 32     | s.              | L. B. T.              |
| 3179       | Mar. 29 | 37 53 30                | 122 52 00 | 53            | 50           | 30     | fne. gy. s.     | Do.                   |
| 3180       | Mar. 29 | 37 50 00                | 122 47 00 | 53            | 50.7         | 24     | fne. gy. s.     | L. B. T. and mud bag. |
| 3181       | Mar. 29 | 37 50 10                | 122 41 30 | 53            | 51           | 16     | fne. gy. s.     | L. B. T.              |
| 3182       | Mar. 29 | 37 49 50                | 122 37 10 | 54            | 52.2         | 11     | fne. gy. s.     | Do.                   |
| 3183       | Apr. 3  | 36 31 00                | 121 59 00 | 52            | 44.5         | 162    | gy. s. r.       | S. B. T.              |
| 3184       | Apr. 3  | 36 26 40                | 122 00 05 | 51            | 46.4         | 77     | s. g.           | Do.                   |
| 3185       | Apr. 3  | 36 27 10                | 121 57 00 | 51            | 48.4         | 41     | crs. s.         | Do.                   |
| 3186       | Apr. 3  | 36 18 50                | 122 06 00 | 52            | 41.3         | 328    | bk. s. m.       | L. B. T.              |
| 3187       | Apr. 3  | 36 14 00                | 121 58 40 | 54            | 41.1         | 298    | yl. s. m.       | Do.                   |
| 3188       | Apr. 3  | 36 08 15                | 121 49 40 | 54            | 45           | 316    | gn. m.          | Do.                   |
| 3189       | Apr. 4  | 35 45 30                | 121 29 00 | 54            | 43.2         | *218   | m.              | Do.                   |
| 3190       | Apr. 4  | 35 40 30                | 121 22 40 | 54            | 49           | 53     | fne. gy. s.     | Do.                   |
| 3191       | Apr. 4  | 35 35 15                | 121 23 00 | 53            | 44           | 211    | br. m.          | Do.                   |
| 3192       | Apr. 4  | 35 33 40                | 121 15 00 | 52            | 47.2         | 101    | bk. s. m.       | Do.                   |
| 3193       | Apr. 5  | 35 25 50                | 121 09 10 | 51            | 44.4         | 160    | gn. m.          | Do.                   |
| 3194       | Apr. 5  | 35 23 30                | 121 02 30 | 53            | 45.9         | 92     | gy. s.          | Do.                   |
| 3195       | Apr. 5  | 35 14 00                | 121 07 00 | 54            | 43.2         | 252    | gn. m.          | Do.                   |
| 3196       | Apr. 5  | 35 02 55                | 120 59 40 | 54            | 44.1         | 200    | gn. m.          | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                 | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.    | Instrument used, etc.         |
|----------------------------|---------|-----------|-----------|---------------|--------------|--------|--------------------|-------------------------------|
|                            |         | Lat. N.   | Long. W.  |               |              |        |                    |                               |
| Off Central California.    |         |           |           |               |              |        |                    |                               |
| 1890.                      |         |           |           |               |              |        |                    |                               |
| 3197                       | Apr. 5  | 35 01 30  | 120 50 30 | 53            | 48.4         | 77     | gn. m              | L. B. T.                      |
| 3198                       | Apr. 6  | 34 19 25  | 120 38 30 | 53            | 42.1         | 278    | gn. m              | L. B. T. and mud bag.         |
| 3199                       | Apr. 6  | 34 16 45  | 120 25 30 | 52            | 43.9         | 233    | gn. m              | L. B. T.                      |
| 3200                       | Apr. 6  | 34 15 00  | 120 14 30 | 52            | 43.1         | 265    | gn. m              | Do.                           |
| 3201                       | Apr. 6  | 34 14 45  | 119 54 00 | 55            | 42.9         | 280    | gn. m              | Do.                           |
| 3202                       | Apr. 11 | 36 46 10  | 121 58 45 | 52            | 41.1         | 382    | gn. m              | Do.                           |
| 3203                       | Apr. 11 | 36 48 00  | 121 53 50 | 54            | 44.7         | 138    | br. m              | Do.                           |
| 3204                       | Apr. 12 | 36 54 45  | 122 20 15 | 55            | 44.1         | 202    | bk. s              | Do.                           |
| 3205                       | Apr. 12 | 36 55 10  | 122 23 50 | 51            | 43.7         | 240    | bk. s. r           | Do.                           |
| 3206                       | Apr. 12 | 36 57 30  | 122 27 30 | 51            |              | 169    |                    | Do.                           |
| 3207                       | Apr. 12 | 37 00 30  | 122 35 30 | 50            | 45.8         | 108    | fne. gy. s         | Do.                           |
| 3208                       | Apr. 12 | 37 01 10  | 122 39 45 | 50            | 44.3         | 203    | fne. gy. s         | Do.                           |
| 3209                       | Apr. 12 | 37 05 15  | 122 42 05 | 50            | 45.4         | 141    | gn. m              | Do.                           |
| South of Alaska Peninsula. |         |           |           |               |              |        |                    |                               |
| 3210                       | May 21  | 54 00 00  | 162 40 30 | 43            | 38.5         | 483    | s. gn. m           | L. B. T.                      |
| 3211                       | May 21  | 54 02 00  | 162 52 00 | 44            | 38.7         | 313    | gn. m              | Do.                           |
| 3212                       | May 21  | 54 05 30  | 162 54 00 | 43            | 38           | 49     | gy. s. bk. sp      | Do.                           |
| 3213                       | May 21  | 54 10 00  | 162 57 30 | 40            |              | 41     | bk. s              | Do.                           |
| 3214                       | May 21  | 54 13 00  | 163 06 00 | 40            |              | 38     | gy. s. g           | Do.                           |
| 3215                       | May 21  | 54 14 40  | 163 24 00 | 43            | 38.5         | 43     | g                  | Do.                           |
| 3216                       | May 21  | 54 20 30  | 163 37 00 | 43            |              | 61     | bk. s. m           | Do.                           |
| 3217                       | May 22  | 54 14 50  | 164 06 00 | 42            |              | 42     | bk. g              | Do.                           |
| 3218                       | May 22  | 54 15 40  | 164 21 00 | 42            | 37.7         | 41     | bk. s              | Do.                           |
| 3219                       | May 22  | 54 14 00  | 164 35 00 | 42            | 38           | 59     | bk. s. g           | Do.                           |
| Bering Sea.                |         |           |           |               |              |        |                    |                               |
| 3220                       | May 22  | 54 15 00  | 165 06 00 | 42            |              | 34     | g. brk. sh         | L. B. T.                      |
| 3221                       | May 22  | 54 15 20  | 165 23 30 | 42            | 39.1         | 66     | bk. s. sh          | Do.                           |
| 3222                       | May 22  | 54 20 00  | 165 30 00 | 40            | 39.7         | 50     | bk. s. p. sh       | Do.                           |
| 3223                       | May 22  | 54 26 15  | 165 32 00 | 42            | 39           | 56     | bk. p              | Do.                           |
| 3224                       | May 22  | 54 42 50  | 165 37 00 | 43            | 38.7         | 121    | bk. s. g           | Do.                           |
| 3225                       | May 22  | 54 48 30  | 165 49 00 | 41            | 38.6         | 85     | bk. s              | Do.                           |
| 3226                       | May 23  | 55 01 00  | 167 25 00 | 42            | 38.5         | 123    | m. s. sh           | S. B. T.                      |
| 3227                       | May 23  | 54 36 30  | 166 54 00 | 42            | 38.6         | 225    | gn. m              | L. B. T.                      |
| 3228                       | May 31  | 58 39 20  | 157 17 30 | 49            |              | 8      | gy. s. p           | S. B. T.                      |
| 3229                       | May 31  | 58 40 00  | 157 15 00 | 50            |              | 8      | gy. s. p           | Do.                           |
| 3230                       | May 31  | 58 31 30  | 157 13 30 | 50            |              | 3.25   | gy. s. p           | Do.                           |
| 3231                       | June 2  | 58 35 00  | 157 28 50 | 47            |              | 12     | s                  | L. B. T.                      |
| 3232                       | June 2  | 58 31 30  | 157 34 15 | 47            |              | 10.5   | p. st              | Do.                           |
| 3233                       | June 2  | 58 23 45  | 157 42 45 | 45            | 44.5         | 7.25   | s. p               | Do.                           |
| 3234                       | June 2  | 58 27 00  | 157 52 00 | 47            |              | 5      | gy. s              | Do.                           |
| 3235                       | June 7  | 58 16 30  | 158 13 00 | 44            |              | 11     | bk. s              | Do.                           |
| 3236                       | June 7  | 58 11 00  | 158 05 30 | 42            | 39           | 14.75  | g. s. sh           | Do.                           |
| 3237                       | June 7  | 58 08 00  | 158 19 00 | 41            |              | 19     | gy. s. g. sh       | Do.                           |
| 3238                       | June 7  | 58 03 40  | 158 37 30 | 39            |              | 18     | fne. gy. s         | Do.                           |
| 3239                       | June 8  | 58 22 20  | 159 23 15 | 44            | 11.5         |        | fne. gy. s         | Do.                           |
| 3240                       | June 8  | 58 30 00  | 159 35 50 | 43            | 14.5         |        | fne. bk. s         | Do.                           |
| 3241                       | June 8  | 58 38 30  | 159 33 30 | 47            | 38           | 14     | bk. m              | Do.                           |
| 3242                       | June 8  | 58 44 30  | 160 08 45 | 45            |              | 11     | bk. m              | Do.                           |
| 3243                       | June 8  | 58 45 10  | 160 28 00 | 46            | 4.5          |        | fne. gy. s         | Do.                           |
| 3244                       | June 9  | 58 37 20  | 161 05 00 | 43            | 4.5          |        | fne. gy. s         | Do.                           |
| 3245                       | June 9  | 58 31 20  | 161 13 00 | 44            | 11.5         |        | s. and p           | Do.                           |
| 3246                       | June 9  | 58 26 30  | 161 36 00 | 40            | 38           | 17.5   | g                  | Do.                           |
| 3247                       | June 13 | 58 40 45  | 162 08 30 | 43            | 40.6         | 17     | p. st              | Do.                           |
| 3248                       | June 13 | 58 34 15  | 162 22 00 | 41            | 43           | 21     | fne. gy. s. g      | Do.                           |
| 3249                       | June 13 | 58 27 30  | 162 36 00 | 39            | 37           | 13.5   | fne. gy. s. bk. sp | Do.                           |
| 3250                       | June 13 | 58 11 30  | 163 02 45 | 40            | 46.2         | 17.5   | gy. s              | Do.                           |
| 3251                       | June 14 | 57 35 50  | 164 05 00 | 39            | 37.5         | 25.5   | fne. gy. s         | Do.                           |
| 3252                       | June 14 | 57 22 20  | 164 24 40 | 40            | 44.8         | 29.5   | bk. m              | Do.                           |
| 3253                       | June 14 | 57 05 50  | 164 27 15 | 42            | 35           | 36     | m. s               | Do.                           |
| 3254                       | June 14 | 56 50 00  | 164 27 50 | 43            | 36.2         | 46     | gn. m. s           | Do.                           |
| 3255                       | June 14 | 56 33 30  | 164 31 40 | 44            | 37           | 43     | gn. m. s           | L. B. T. and surface tow net. |
| 3256                       | June 14 | 56 18 00  | 164 34 10 | 45            | 35           | 49     | gn. m bk. sh       | L. B. T.                      |
| 3257                       | June 24 | 54 49 00  | 165 32 00 | 45            | 39           | 81     | gy. s. g           | Do.                           |
| 3258                       | June 24 | 54 48 00  | 165 13 30 | 44            | 39           | 70     | bk. s. g           | Do.                           |
| 3259                       | June 24 | 54 40 50  | 165 05 30 | 44            | 40.6         | 41     | bk. s. g           | Do.                           |
| 3260                       | June 24 | 54 36 15  | 164 52 00 | 44            | 42           | 13     | fne. bk. s         | Do.                           |
| 3261                       | June 24 | 54 42 15  | 164 49 15 | 45            | 41.2         | 27     | bk. g. p           | Do.                           |
| 3262                       | June 24 | 54 49 30  | 165 02 00 | 45            | 40.7         | 43     | bk. s. r           | Do.                           |
| 3263                       | June 24 | 55 04 00  | 165 04 00 | 45            | 39.5         | 61     | bk. m              | Do.                           |
| 3264                       | June 24 | 54 57 00  | 164 48 00 | 45            | 40.5         | 40     | crs s. g           | Do.                           |
| 3265                       | June 25 | 55 16 30  | 163 52 45 | 45            | 39.8         | 38     | bk. s              | Do.                           |
| 3266                       | June 25 | 55 08 30  | 163 30 30 | 45            | 42           | 24     | bk. s              | Do.                           |
| 3267                       | June 25 | 55 23 30  | 163 29 00 | 46            | 41           | 32     | bk. s              | Do.                           |
| 3268                       | June 25 | 55 29 00  | 163 13 00 | 47            | 41.2         | 20     | bk. s. g           | Do.                           |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.            | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc. |
|-----------------------|---------|-----------|-----------|---------------|--------------|--------|---------------------|-----------------------|
|                       |         | Lat. N.   | Long. W.  |               |              |        |                     |                       |
| Bering Sea.           |         |           |           |               |              |        |                     |                       |
|                       | 1890.   | ° ' "     | ° ' "     | ° F.          | ° F.         | Fms.   |                     |                       |
| 3269                  | June 25 | 55 19 00  | 163 04 30 | 44            | 42.3         | 16     | fne. gy. s. bk. sh. | L. B. T.              |
| 3270                  | June 26 | 55 26 30  | 162 52 00 | 47            | 43.5         | 16     | bk. s.              | Do.                   |
| 3271                  | June 26 | 55 29 15  | 162 58 00 | 47            | 41.9         | 25     | bk. s.              | Do.                   |
| 3272                  | June 27 | 55 31 40  | 163 07 00 | 45            | 42           | 31     | bk. and rd. s.      | Do.                   |
| 3273                  | June 27 | 55 44 30  | 162 56 00 | 45            | 38.5         | 39     | gy. s. m.           | Do.                   |
| 3274                  | June 27 | 55 34 30  | 162 31 45 | 45            |              | 19     | bk. s. sh.          | Do.                   |
| 3275                  | June 27 | 55 44 20  | 162 17 30 | 45            | 42.8         | 22     | fne. bk. s.         | Do.                   |
| 3276                  | June 28 | 55 51 15  | 162 03 00 | 43            | 42           | 18     | g. s. r.            | S. B. T.              |
| 3277                  | June 28 | 55 58 45  | 161 46 30 | 46            | 43.2         | 18     | g. s. r.            | Tangles.              |
| 3278                  | June 28 | 56 12 30  | 162 13 00 | 44            | 38.8         | 47     | fne. gy. s.         | L. B. T.              |
| 3279                  | June 28 | 56 25 40  | 162 39 15 | 55            | 37           | 41     | fne. gy. s.         | Do.                   |
| 3280                  | June 28 | 56 27 00  | 162 08 00 | 55            | 41           | 36     | fne. gy. s.         | Do.                   |
| 3281                  | June 28 | 56 14 00  | 161 41 15 | 55            |              | 36     | gy. s. bk. sp.      | Do.                   |
| 3282                  | June 29 | 56 30 45  | 161 50 15 | 55            | 38.2         | 53     | fne. s. gn. m.      | Do.                   |
| 3283                  | June 29 | 56 28 00  | 161 16 30 | 44            | 40.3         | 39     | fne. gy. s.         | Do.                   |
| 3284                  | June 29 | 56 18 30  | 160 53 00 | 47            | 43           | 25     | fne. g.             | Do.                   |
| 3285                  | July 17 | 56 45 45  | 160 42 45 | 44            | 41           | 35     | gy. s. bk. sp.      | Do.                   |
| 3286                  | July 17 | 56 39 30  | 160 29 00 | 45            | 41.5         | 37     | fne. gy. s. sh. g.  | Do.                   |
| 3287                  | July 17 | 56 33 00  | 160 14 00 | 46            | 42           | 30     | crs. bk. s.         | Do.                   |
| 3288                  | July 17 | 56 26 30  | 160 00 00 | 46            | 45.5         | 15     | bk. g.              | Do.                   |
| 3289                  | July 18 | 56 44 30  | 159 16 00 | 45            |              | 16     | bk. s.              | Do.                   |
| 3290                  | July 18 | 56 50 30  | 159 01 00 | 47            |              | 16     | gy. s. g.           | Do.                   |
| 3291                  | July 18 | 56 58 30  | 159 11 00 | 45            | 41.2         | 26     | bk. s. g.           | Do.                   |
| 3292                  | July 18 | 57 14 00  | 159 35 00 | 45            |              | 32     | bk. s. g.           | Do.                   |
| 3293                  | July 18 | 57 30 00  | 159 33 00 | 44            | 40           | 30     | fne. gy. s.         | Do.                   |
| 3294                  | July 18 | 57 16 45  | 159 03 30 | 45            | 41           | 30     | bk. g.              | Do.                   |
| 3295                  | July 19 | 57 14 30  | 158 26 30 | 50            |              | 11.5   | fne. gy. s.         | Do.                   |
| 3296                  | July 19 | 57 26 30  | 158 46 00 | 47            | 43           | 24     | gy. s. bk. sp.      | Do.                   |
| 3297                  | July 19 | 57 38 00  | 159 07 30 | 47            | 41.5         | 26     | gy. s.              | Do.                   |
| 3298                  | July 19 | 57 38 30  | 158 22 30 | 48            | 43.8         | 20     | fne. gy. s.         | Do.                   |
| 3299                  | July 20 | 57 59 00  | 158 44 00 | 54            | 44           | 20     | fne. gy. s. yl. sp. | Do.                   |
| 3300                  | July 20 | 58 12 30  | 159 55 00 | 51            | 42.2         | 15     | p.                  | Do.                   |
| 3301                  | July 20 | 58 12 45  | 160 37 30 | 52            |              | 17     | fne. gy. s.         | Do.                   |
| 3302                  | July 21 | 57 45 45  | 160 12 15 | 51            | 40.2         | 30     | fne. gy. s.         | Do.                   |
| 3303                  | July 21 | 57 27 00  | 160 23 30 | 50            | 39.5         | 33     | bk. s.              | Do.                   |
| 3304                  | July 21 | 58 02 30  | 161 13 45 | 49            |              | 28     | fne. gy. s.         | C. R. D.              |
| 3305                  | July 22 | 57 51 30  | 161 40 00 | 56            | 41.8         | 23     | fne. gy. s.         | Do.                   |
| 3306                  | July 22 | 57 24 30  | 161 17 00 | 52            | 38.9         | 33     | fne. gy. s.         | Do.                   |
| 3307                  | Aug. 3  | 53 55 00  | 170 50 00 | 50            | 35.4         | 1,033  | gn. oz.             | D. S. T.              |
| 3308                  | Aug. 4  | 56 12 00  | 172 07 00 | 50            | 35           | 1,625  | gn. oz.             | Do.                   |
| 3309                  | Aug. 4  | 56 56 00  | 172 55 00 | 50            | 37.9         | 71     | gn. m.              | L. B. T.              |
| 3310                  | Aug. 15 | 53 56 51  | 166 28 53 | 54            | 41.5         | 58     | fne. dk. s. m.      | S. B. T.              |
| 3311                  | Aug. 15 | 53 59 36  | 166 29 43 | 52            | 41           | 85     | gn. m.              | Do.                   |
| 3312                  | Aug. 15 | 53 59 11  | 166 25 09 | 55            | 43           | 45     | fne. s. m.          | Do.                   |
| 3313                  | Aug. 15 | 54 01 51  | 166 27 38 | 55            | 42.7         | 68     | fne. bk. s.         | Do.                   |
| 3314                  | Aug. 15 | 54 02 24  | 166 32 47 | 55            | 42.5         | 74     | bk. s.              | Do.                   |
| 3315                  | Aug. 15 | 54 02 40  | 166 42 00 | 55            | 38.5         | 277    | gn. m. s.           | Do.                   |
| 3316                  | Aug. 16 | 54 01 00  | 166 48 45 | 56            | 38.2         | 309    | bk. s. g.           | Do.                   |
| 3317                  | Aug. 16 | 53 57 40  | 166 59 00 | 54            | 39.5         | 165    | crs. s. g. r.       | Do.                   |
| 3318                  | Aug. 16 | 53 47 40  | 167 14 00 | 52            | 42           | 61     | bk. s. g. sh.       | Do.                   |
| 3319                  | Aug. 18 | 53 40 30  | 167 30 00 | 52            | 40.8         | 59     | bk. s.              | L. B. T.              |
| 3320                  | Aug. 18 | 53 40 00  | 167 29 45 | 52            | 40.8         | 59     | bk. s. co.          | Tangles.              |
| 3321                  | Aug. 18 | 53 33 30  | 167 15 40 | 50            | 41.5         | 54     | dk. m.              | L. B. T.              |
| 3322                  | Aug. 18 | 53 28 45  | 167 23 50 | 50            | 42.4         | 35     | bk. s.              | Do.                   |
| 3323                  | Aug. 19 | 53 26 00  | 167 31 10 | 46            | 42           | 51     | fne. bk. s.         | Do.                   |
| 3324                  | Aug. 20 | 53 33 50  | 167 46 50 | 47            |              | 109    | crs. bk. s. g. r.   | Do.                   |
| 3325                  | Aug. 20 | 53 37 10  | 167 50 10 | 49            | 38           | 284    | gn. m.              | Do.                   |
| 3326                  | Aug. 20 | 53 40 25  | 167 41 40 | 49            | 37.5         | 576    | m.                  | Do.                   |
| 3327                  | Aug. 20 | 53 43 40  | 167 29 30 | 49            | 38.2         | 322    | bk. s.              | S. B. T.              |
| 3328                  | Aug. 21 | 53 41 45  | 167 19 25 | 48            | 37           | 578    | m.                  | L. B. T.              |
| 3329                  | Aug. 21 | 53 56 50  | 167 08 15 | 51            | 37.7         | 399    | fne. bk. s.         | Do.                   |
| 3330                  | Aug. 21 | 54 00 45  | 166 53 50 | 51            | 37.8         | 351    | bk. s. m.           | Do.                   |
| 3331                  | Aug. 21 | 54 01 40  | 166 48 50 | 52            |              | 350    | m.                  | Do.                   |
| 3332                  | Aug. 21 | 54 02 50  | 166 45 00 | 52            |              | 406    | rky. s.             | Do.                   |
| 3333                  | Aug. 22 | 53 53 35  | 166 30 15 | 48            | 43.9         | 19     | gn. m.              | S. B. T.              |
| 3334                  | Aug. 22 | 53 56 20  | 166 29 15 | 48            | 42.6         | 50     | m. s.               | Do.                   |
| 3335                  | Aug. 22 | 53 58 05  | 166 33 25 | 47            | 40.8         | 93     | m.                  | Do.                   |
| 3336                  | Aug. 22 | 53 56 55  | 166 33 35 | 50            | 41.6         | 55     | fne. bk. s.         | Do.                   |
| Unalaska to Kodiak.   |         |           |           |               |              |        |                     |                       |
| 3337                  | Aug. 27 | 53 55 30  | 163 26 00 | 51            | 39.3         | 280    | gn. mr.             | L. B. T.              |
| 3338                  | Aug. 28 | 54 19 00  | 159 40 00 | 51            | 37.3         | 625    | gn. m. s.           | Do.                   |
| 3339                  | Aug. 28 | 54 46 00  | 157 43 30 | 52            | 37.4         | 138    | m. g.               | Do.                   |
| 3340                  | Aug. 29 | 55 26 00  | 155 26 00 | 52            | 36.8         | 695    | m.                  | Do.                   |
| 3341                  | Aug. 29 | 56 01 30  | 153 52 00 | 54            | 41.1         | 67     | fne. gy. s.         | Do.                   |
| Off British Columbia. |         |           |           |               |              |        |                     |                       |
| 3342                  | Sept. 3 | 52 30 30  | 132 38 00 | 57            | 35.3         | 1,588  | gy. oz. crs. s.     | L. B. T.              |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.               | Date.    | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc. |
|--------------------------|----------|-----------|-----------|---------------|--------------|--------|---------------------|-----------------------|
|                          |          | Lat. N.   | Long. W.  |               |              |        |                     |                       |
| Off Washington.          |          |           |           |               |              |        |                     |                       |
| 1890.                    |          |           |           |               |              |        |                     |                       |
| 3343                     | Sept. 21 | 47 40 40  | 125 20 00 | 54            | 38.2         | 516    | gn. m               | L. B. T.              |
| 3344                     | Sept. 21 | 47 20 00  | 125 07 30 | 52            | 36.8         | 831    | gn. m               | Do.                   |
| 3345                     | Sept. 22 | 45 39 00  | 124 53 00 | 57            | 37.3         | 759    | gn. m               | Do.                   |
| 3346                     | Sept. 22 | 45 30 00  | 124 52 00 | 54            | 37.3         | 786    | gn. m               | Do.                   |
| 3347                     | Sept. 22 | 45 09 35  | 124 45 00 | 54            | 40.9         | 345    | m                   | Do.                   |
| Off Northern California. |          |           |           |               |              |        |                     |                       |
| 3348                     | Sept. 25 | 39 02 40  | 124 06 15 | 54            | 47.6         | 455    | fne. gy. s          | L. B. T.              |
| 3349                     | Sept. 25 | 38 57 45  | 124 03 05 | 54            | 44.1         | 239    | bk. s               | Do.                   |
| 3350                     | Sept. 25 | 38 58 10  | 123 57 05 | 54            | 48.4         | 75     | fne. s. m           | Do.                   |
| 3351                     | Sept. 25 | 38 59 40  | 123 50 50 | 54            | 50           | 51     | m                   | S. B. T.              |
| 3352                     | Sept. 25 | 39 01 10  | 123 44 00 | 54            | 51.5         | 26     | fne. br. s          | Do.                   |
| Off Panama.              |          |           |           |               |              |        |                     |                       |
| 1891.                    |          |           |           |               |              |        |                     |                       |
| 3353                     | Feb. 23  | 7 06 15   | 80 34 00  | 73            | 39           | 695    | gn. m               | L. B. T.              |
| 3354                     | Feb. 23  | 7 09 45   | 80 50 00  | 78            | 46           | 322    | gn. m               | Do.                   |
| 3355                     | Feb. 23  | 7 12 20   | 80 55 00  | 81            | 54.1         | 182    | bk. g. sh.          | Do.                   |
| 3356                     | Feb. 23  | 7 09 30   | 81 08 30  | 83            | 40.1         | 546    | sft. bl. m          | Do.                   |
| 3357                     | Feb. 24  | 6 35 00   | 81 44 00  | 83            | 38.5         | 782    | gn. s               | Do.                   |
| 3358                     | Feb. 24  | 6 30 00   | 81 44 00  | 83            | 40.2         | 555    | gn. s               | Do.                   |
| 3359                     | Feb. 24  | 6 22 20   | 81 52 00  | 83            | 42           | 465    | rky                 | Tangles.              |
| 3360                     | Feb. 24  | 6 17 00   | 82 05 00  | 83            | 36.4         | 1,672  | fne. bk. & gn. s    | L. B. T.              |
| 3361                     | Feb. 25  | 6 10 00   | 83 06 00  | 82            | 36.6         | 1,471  | gn. oz              | Do.                   |
| 3362                     | Feb. 26  | 5 56 00   | 85 10 30  | 84            | 36.8         | 1,175  | gn. m. s. r         | L. B. T.              |
| 3363                     | Feb. 26  | 5 43 00   | 85 50 00  | 83            | 37.5         | 978    | wh. glob. oz        | Do.                   |
| 3364                     | Feb. 27  | 5 30 00   | 86 08 30  | 81            | 38           | 902    | yl. glob. oz        | Do.                   |
| 3365                     | Feb. 27  | 5 31 00   | 86 31 00  | 85            | 37           | 1,010  | yl. glob. oz        | Agassiz, B. T.        |
| 3366                     | Feb. 27  | 5 30 00   | 86 45 00  | 84            | 37           | 1,067  | yl. glob. oz        | L. B. T.              |
| 3367                     | Feb. 28  | 5 31 30   | 86 52 30  | 82            | 57           | 100    | rky                 | S. B. T.              |
| 3368                     | Feb. 28  | 5 32 45   | 86 54 30  | 82            | 58.4         | 66     | rky                 | Do.                   |
| 3369                     | Feb. 28  | 5 32 45   | 86 55 20  | 82            | 62.2         | 52     | rky                 | L. B. T. a            |
| 3370                     | Feb. 23  | 5 36 40   | 86 56 50  | 84            | 54.8         | 134    | r. sh               | Tangles.              |
| 3371                     | Mar. 1   | 5 26 20   | 86 55 00  | 82            | 39           | 770    | glob. oz            | Agassiz, B. T.        |
| 3372                     | Mar. 1   | 4 49 00   | 86 11 20  | 84            | 38.8         | 761    | gy. glob. oz        | Do.                   |
| 3373                     | Mar. 2   | 4 02 00   | 84 58 00  | 82            | 36.6         | 1,977  | bn. m. bk. sp.      | Do.                   |
| 3374                     | Mar. 3   | 2 35 00   | 83 53 00  | 80            | 36.4         | 1,823  | gn. oz              | L. B. T.              |
| 3375                     | Mar. 4   | 2 34 00   | 82 29 00  | 77            | 36.6         | 1,201  | gy. glob. oz        | L. B. T., mud bag.    |
| 3376                     | Mar. 4   | 3 09 00   | 82 08 00  | 78            | 36.3         | 1,132  | gy. glob. oz        | Do.                   |
| 3377                     | Mar. 5   | 3 56 00   | 81 40 15  | 77            | 38           | 764    | m                   | Do.                   |
| 3378                     | Mar. 5   | 3 58 20   | 81 36 00  | 78            | 55.9         | 112    | brk. sh             | S. B. T.              |
| 3379                     | Mar. 5   | 3 59 40   | 81 35 00  | 78            | 52           | r      | r                   | Tangles.              |
| 3380                     | Mar. 5   | 4 03 00   | 81 31 00  | 79            | 37.2         | 899    | r                   | L. B. T.              |
| 3381                     | Mar. 6   | 4 56 00   | 80 52 30  | 77            | 35.8         | 1,772  | gn. m               | Do.                   |
| 3382                     | Mar. 7   | 6 21 00   | 80 41 00  | 75            | 35.8         | 1,793  | gn. m               | Do. b                 |
| 3383                     | Mar. 8   | 7 21 00   | 79 02 00  | 74            | 36           | 1,832  | gn. glob. oz        | Do.                   |
| 3384                     | Mar. 8   | 7 31 30   | 79 14 00  | 74            | 42           | 458    | gn. s               | Do.                   |
| 3385                     | Mar. 8   | 7 32 36   | 79 16 00  | 72            | 45.9         | 286    | gn. m               | Do.                   |
| 3386                     | Mar. 8   | 7 33 12   | 79 17 15  | 73            | 48           | 242    | fne. gy. s          | Do.                   |
| 3387                     | Mar. 8   | 7 40 00   | 79 17 50  | 74            | 56.2         | 127    | fne. gy. s          | Do.                   |
| 3388                     | Mar. 9   | 7 06 00   | 79 48 00  | 73            | 36.2         | 1,168  | gn. glob. oz        | Do.                   |
| 3389                     | Mar. 9   | 7 16 45   | 79 56 30  | 74            | 48.8         | 210    | gn. m               | Do.                   |
| 3390                     | Mar. 9   | 7 26 10   | 79 53 50  | 74            | 62.6         | 56     | fne. gy. s. g       | Do.                   |
| 3391                     | Mar. 9   | 7 33 40   | 79 43 20  | 73            | 55.8         | 153    | gn. m               | Do.                   |
| 3392                     | Mar. 10  | 7 05 30   | 79 40 00  | 73            | 36.4         | 1,270  | hrd                 | Do.                   |
| 3393                     | Mar. 10  | 7 15 00   | 79 36 00  | 74            | 36.8         | 1,020  | gn. m               | Do.                   |
| 3394                     | Mar. 10  | 7 21 00   | 79 35 00  | 73            | 41.8         | 511    | dk. gn. m           | Do.                   |
| 3395                     | Mar. 11  | 7 30 36   | 78 39 00  | 70            | 38.5         | 730    | rky                 | Do.                   |
| 3396                     | Mar. 11  | 7 32 00   | 78 36 30  | 70            | 47.4         | 259    | hrd. gy. m. s       | Do.                   |
| 3397                     | Mar. 11  | 7 33 00   | 78 34 20  | 71            | 57.3         | 85     | sft. gn. m. brk. sh | Do.                   |
| 3398                     | Mar. 23  | 1 07 00   | 80 21 00  | 84            | 36           | 1,573  | gn. oz              | Blake B. T.           |
| 3399                     | Mar. 24  | 1 07 00   | 81 04 00  | 80            | 36           | 1,740  | gn. oz              | L. B. T.              |
| Off Galapagos Islands.   |          |           |           |               |              |        |                     |                       |
| Lat. S.                  |          |           |           |               |              |        |                     |                       |
| 3400                     | Mar. 27  | 0 36 00   | 86 46 00  | 81            | 36.1         | 1,322  | lt. gy. glob. oz    | L. B. T.              |
| 3401                     | Mar. 28  | 0 59 00   | 88 58 30  | 82            | 43.8         | 395    | glob. oz            | Do.                   |
| 3402                     | Mar. 28  | 0 57 30   | 89 03 30  | 82            | 42.3         | 421    | r. glob. oz         | S. B. T.              |
| 3403                     | Mar. 28  | 0 58 30   | 89 17 00  | 82            | 43.3         | 384    | fne. gy. s. bk. sp  | Do.                   |
| 3404                     | Mar. 28  | 1 03 00   | 89 28 00  | 83            | 43.2         | 385    | r                   | Do.                   |
| 3405                     | Mar. 28  | 0 57 00   | 89 38 00  | 83            | 59.9         | 53     | p. co. sh           | Tangles.              |
| 3406                     | Apr. 3   | 0 16 00   | 90 21 30  | 81            | 41.3         | 551    | r                   | S. B. T.              |
| 3407                     | Apr. 3   | 0 04 00   | 90 24 30  | 81            | 37.2         | 885    | glob. oz            | L. B. T.              |
| Lat. N.                  |          |           |           |               |              |        |                     |                       |
| 3408                     | Apr. 3   | 0 12 30   | 90 32 30  | 83            | 39.5         | 684    | glob. oz            | L. B. T.              |
| 3409                     | Apr. 3   | 0 18 40   | 90 34 00  | 82            | 42.3         | 327    | bk. s               | S. B. T.              |
| 3410                     | Apr. 3   | 0 19 00   | 90 34 00  | 82            | 44           | 331    | bk. s               | Do.                   |

a Bottom also known as Nullipore.

b Three trials submarine tow net.



Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.             | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc. |
|------------------------|---------|-----------|-----------|---------------|--------------|--------|---------------------|-----------------------|
|                        |         | Lat. N.   | Long. W.  |               |              |        |                     |                       |
| Off Galapagos Islands. |         |           |           |               |              |        |                     |                       |
| 1891.                  |         |           |           |               |              |        |                     |                       |
| 3411                   | Apr. 4  | 0 54 00   | 91 09 00  | 82            | 36.2         | 1,189  | yl. glob. oz.       | L. B. T.              |
| 3412                   | Apr. 4  | 1 23 00   | 91 43 00  | 82            | 38           | 918    | r                   | Do.                   |
| 3413                   | Apr. 5  | 2 34 00   | 92 06 00  | 82            | 36           | 1,360  | glob. oz. dk. sp.   | Do.                   |
| Off Mexico.            |         |           |           |               |              |        |                     |                       |
| 3414                   | Apr. 8  | 10 14 00  | 96 28 00  | 82            | 35.8         | 2,232  | gn. m.              | L. B. T. a            |
| 3415                   | Apr. 10 | 14 46 00  | 98 40 00  | 83            | 36           | 1,879  | bn. m. glob. oz.    | Do.                   |
| 3416                   | Apr. 11 | 16 32 30  | 99 42 40  | 81            | 40.5         | 419    | bn. m.              | Do.                   |
| 3417                   | Apr. 11 | 16 32 00  | 99 48 00  | 82            | 40.6         | 493    | gn. m.              | S. B. T.              |
| 3418                   | Apr. 11 | 16 33 00  | 99 52 30  | 82            | 39           | 660    | bn. s. bk. sp.      | Do.                   |
| 3419                   | Apr. 11 | 16 34 30  | 100 03 00 | 81            | 39           | 672    | gn. m. bk. sp.      | Do.                   |
| 3420                   | Apr. 12 | 16 46 00  | 100 08 20 | 82            | 39.6         | 664    | dk. gn. m.          | Do.                   |
| 3421                   | Apr. 12 | 16 47 20  | 100 00 10 | 82            | 42.9         | 388    | dk. gn. m.          | Do.                   |
| 3422                   | Apr. 12 | 16 47 30  | 99 59 30  | 83            | 53.3         | 141    | gn. m.              | Do.                   |
| 3423                   | Apr. 12 | 16 47 30  | 99 59 20  | 83            | 55.8         | 94     | gn. m.              | Do.                   |
| 3424                   | Apr. 18 | 21 15 00  | 106 23 00 | 76            | 38           | 676    | gy. s. bk. sp.      | Do.                   |
| 3425                   | Apr. 18 | 21 19 00  | 106 24 00 | 76            | 39           | 680    | gn. m. s.           | Do.                   |
| 3426                   | Apr. 18 | 21 21 00  | 106 25 00 | 76            | 51.2         | 146    | rky                 | Do.                   |
| 3427                   | Apr. 18 | 21 22 15  | 106 25 00 | 76            | 51.2         | 80     | rky                 | Tangles.              |
| 3428                   | Apr. 18 | 21 36 30  | 106 25 00 | 76            | 48.1         | 238    | dk. gy. s.          | S. B. T.              |
| 3429                   | Apr. 19 | 22 30 30  | 107 01 00 | 73            | 37.5         | 919    | gn. oz. rky.        | Do.                   |
| 3430                   | Apr. 19 | 23 16 00  | 107 31 00 | 73            | 37.9         | 852    | bk. s.              | Do.                   |
| Gulf of California.    |         |           |           |               |              |        |                     |                       |
| 3431                   | Apr. 20 | 23 59 00  | 108 40 00 | 70            | 37           | 995    | lt. bn. m.          | S. B. T.              |
| 3432                   | Apr. 20 | 24 22 30  | 109 03 20 | 70            | 37.8         | 1,421  | bn. m. bk. sp.      | L. B. T.              |
| 3433                   | Apr. 21 | 25 26 15  | 109 48 00 | 69            | 36.5         | 1,218  | bn. m. bk. sp.      | S. B. T.              |
| 3434                   | Apr. 21 | 25 29 30  | 109 48 00 | 70            | 36.4         | 1,588  | bn. m. bk. sp.      | Do.                   |
| 3435                   | Apr. 22 | 26 48 00  | 110 45 20 | 70            | 37.3         | 859    | bn. m. bk. sp.      | Do.                   |
| 3436                   | Apr. 22 | 27 03 40  | 110 53 40 | 72            | 37.2         | 905    | bn. m. bk. sp.      | Do.                   |
| 3437                   | Apr. 23 | 27 39 40  | 111 00 30 | 70            | 40           | 628    | bn. m. bk. sp.      | Submarine tow net.    |
| Bering Sea.            |         |           |           |               |              |        |                     |                       |
| 3438                   | Aug. 3  | 57 06 30  | 170 22 30 | 45            | -----        | 20     | fne. gy. s. sh.     | S. B. T.              |
| 3439                   | Aug. 3  | 57 06 00  | 170 35 00 | 44            | 44           | 41     | fne. bk. s.         | Do.                   |
| 3440                   | Aug. 3  | 57 05 00  | 170 41 00 | 46            | -----        | 48     | bk. m. sh.          | Do.                   |
| 3441                   | Aug. 3  | 57 04 20  | 170 52 30 | 48            | 39           | 51     | bk. m. sh.          | Do.                   |
| 3442                   | Aug. 3  | 57 10 00  | 170 47 15 | 50            | 40           | 47     | bl. m. sh.          | Do.                   |
| Off Washington.        |         |           |           |               |              |        |                     |                       |
| 3443                   | Aug. 27 | 48 13 30  | 123 11 20 | 57            | 46           | 97     | gn. m. p.           | L. B. T.              |
| 3444                   | Aug. 27 | 48 16 30  | 123 29 40 | 56            | 45           | 80     | gn. m. p.           | Do.                   |
| 3445                   | Aug. 27 | 48 16 00  | 123 45 05 | 65            | 44           | 100    | rky                 | Do.                   |
| 3446                   | Aug. 27 | 48 18 50  | 123 58 20 | 53            | 44.5         | 100    | bu. m.              | Do.                   |
| 3447                   | Aug. 28 | 48 30 15  | 124 36 20 | 54            | 44           | 116    | gy. s.              | Do.                   |
| 3448                   | Aug. 28 | 48 31 40  | 124 39 00 | 55            | 44           | 98     | gy. s.              | Do.                   |
| 3449                   | Aug. 28 | 48 29 40  | 124 40 10 | 55            | -----        | 135    | gy. s. g.           | Do.                   |
| 3450                   | Aug. 28 | 48 26 50  | 124 39 35 | 53            | 44           | 151    | g.                  | Do.                   |
| 3451                   | Aug. 28 | 48 25 10  | 124 37 50 | 53            | 45           | 106    | g. st.              | Do.                   |
| 3452                   | Aug. 29 | 48 24 40  | 124 29 10 | 53            | 44.5         | 125    | rky. bk. g.         | Do.                   |
| 3453                   | Aug. 29 | 48 20 00  | 124 13 40 | 57            | 44.4         | 120    | gy. s. bk. sp.      | Do.                   |
| 3454                   | Sept. 1 | 48 27 50  | 124 42 40 | 54            | 44.2         | 152    | gy. s. rky.         | Do.                   |
| 3455                   | Sept. 1 | 48 28 40  | 124 43 50 | 54            | 44.3         | 152    | gy. s. rky.         | Do.                   |
| 3456                   | Sept. 1 | 48 31 15  | 124 43 15 | 55            | 44.2         | 136    | gy. s.              | Do.                   |
| 3457                   | Sept. 1 | 48 28 20  | 124 52 05 | 54            | 44.2         | 142    | gy. s.              | Do.                   |
| 3458                   | Sept. 2 | 48 21 50  | 124 24 00 | 51            | -----        | 115    | dk. s. st.          | Do.                   |
| 3459                   | Sept. 2 | 48 24 20  | 124 24 40 | 53            | 44.5         | 123    | gy. s. p.           | Do.                   |
| 3460                   | Sept. 2 | 48 25 05  | 124 10 00 | 53            | 46.8         | 53     | gy. s.              | Do.                   |
| 3461                   | Sept. 2 | 48 17 20  | 124 07 25 | 54            | 44.4         | 114    | gy. s. g. rks.      | Do.                   |
| 3462                   | Sept. 3 | 48 15 00  | 123 35 50 | 53            | 44.8         | 92     | dk. s. rky.         | Do.                   |
| 3463                   | Sept. 4 | 48 09 30  | 123 23 30 | 52            | 47.8         | 45     | gy. s.              | Do.                   |
| 3464                   | Sept. 4 | 48 14 00  | 123 20 40 | 55            | 47.8         | 40     | gy. s. p.           | Do.                   |
| 3465                   | Sept. 4 | 48 21 00  | 123 14 00 | 55            | 49.9         | 48     | rky                 | Do.                   |
| 3466                   | Sept. 4 | 48 18 30  | 123 22 00 | 53            | 48.5         | 56     | gy. s. sh. rky.     | Do.                   |
| Hawaiian Islands.      |         |           |           |               |              |        |                     |                       |
| 3467                   | Dec. 3  | 21 13 00  | 157 43 37 | 76            | -----        | 310    | fne. wh. s. bk. sp. | S. B. T.              |
| 3468                   | Dec. 3  | 21 15 36  | 157 41 10 | 76            | -----        | 17     | s. co.              | Tangles.              |
| 3469                   | Dec. 3  | 21 14 51  | 157 43 30 | 76            | -----        | 14     | s. co.              | Do.                   |
| 3470                   | Dec. 4  | 21 08 30  | 157 49 00 | 76            | 43.3         | 343    | wh. s.              | L. B. T.              |
| 3471                   | Dec. 4  | 21 10 30  | 157 48 30 | 76            | -----        | 337    | fne. wh. s.         | Do.                   |
| 3472                   | Dec. 4  | 21 12 00  | 157 49 00 | 78            | -----        | 295    | fne. wh. s.         | Do.                   |
| 3473                   | Dec. 6  | 21 15 00  | 157 30 00 | 76            | 43.8         | 313    | fne. gy. s.         | Do.                   |
| 3474                   | Dec. 6  | 21 12 00  | 157 38 30 | 77            | -----        | 375    | fne. wh. s.         | Do.                   |
| 3475                   | Dec. 6  | 21 08 00  | 157 43 00 | 76            | -----        | 351    | fne. wh. s.         | Do.                   |
| 3476                   | Dec. 6  | 21 09 00  | 157 53 00 | 76            | -----        | 298    | fne. wh. s.         | Do.                   |

<sup>a</sup> Three trials submarine tow net.



## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.              | Date.   | Position. |           | Surface temp. | Bottom temp. | Depth. | Kind of bottom.      | Instrument used, etc.    |
|-------------------------|---------|-----------|-----------|---------------|--------------|--------|----------------------|--------------------------|
|                         |         | Lat. N.   | Long. W.  |               |              |        |                      |                          |
| Off San Francisco, Cal. |         |           |           |               |              |        |                      |                          |
| 1893.                   |         |           |           |               |              |        |                      |                          |
| 3477                    | Apr. 26 | 36 50 00  | 121 59 45 | 51            | 46.5         | 80     | rky                  | L. B. T.                 |
| 3478                    | Apr. 26 | 36 44 45  | 120 57 00 | 53            |              | 68     | gy. s. m.            | L. B. T., surf.          |
| 3479                    | Apr. 27 | 37 28 00  | 123 00 00 | 50            |              | 276    | gn. m. fine. s.      | L. B. T.                 |
| Bering Sea.             |         |           |           |               |              |        |                      |                          |
| 3480                    | July 8  | 52 06 00  | 171 45 00 | 47            |              | 283    | bk. s. co. rky       | Do.                      |
| 3481                    | July 8  | 52 15 00  | 171 40 00 | 48            |              | 248    | bk. s. g.            | L. B. T., swabs.         |
| 3482                    | July 12 | 57 18 00  | 170 42 00 | 42            | 38.9         | 42     | gn. m. fine. s.      | S. B. T., swabs.         |
| 3483                    | July 12 | 57 18 00  | 171 18 00 | 42            | 36.8         | 56     | gn. m.               | Do.                      |
| 3484                    | July 12 | 57 18 00  | 171 54 00 | 44            | 37.4         | 60     | bu. m.               | L. B. T., mud bag.       |
| 3485                    | July 12 | 57 18 00  | 172 34 00 | 44            | 37.1         | 62     | gn. m.               | L. B. T.                 |
| 3486                    | July 13 | 57 19 00  | 173 53 00 | 43            | 38           | 150    | gn. m. fine. s.      | L. B. T., mud bag.       |
| 3487                    | July 13 | 57 10 00  | 173 45 00 | 43            | 37.6         | 81     | gn. m. fine. s.      | Do.                      |
| 3488                    | July 13 | 57 05 00  | 173 47 00 | 45            | 37.3         | 106    | gn. m. gy. s.        | Do.                      |
| 3489                    | July 13 | 57 00 00  | 173 14 00 | 46            | 38.5         | 184    | gn. m. gy. s.        | Do.                      |
| 3490                    | July 13 | 56 47 00  | 173 14 00 | 46            | 38           | 78     | gn. m. fine. s.      | Do.                      |
| 3491                    | July 14 | 56 32 00  | 172 28 00 | 44            |              | 103    | gn. m. fine. gy. s.  | Do.                      |
| 3492                    | July 14 | 56 32 00  | 171 50 00 | 45            | 37.8         | 70     | gn. m. fine. s.      | Do.                      |
| 3493                    | July 14 | 56 33 00  | 171 20 00 | 46            | 38.5         | 67     | gn. m. fine. s.      | Do.                      |
| 3494                    | July 14 | 56 34 00  | 170 34 00 | 46            | 38.5         | 65     | gn. m. fine. s.      | L. B. T.                 |
| 3495                    | July 14 | 56 37 00  | 170 01 00 | 45            | 38.5         | 56     | gn. m. fine. s.      | Do.                      |
| 3496                    | July 17 | 56 32 00  | 169 45 00 | 42            | 39.9         | 41     | gy. s. st. gn. m.    | L. B. T., mud bag        |
| 3497                    | July 17 | 56 18 00  | 169 38 00 | 42            | 38.7         | 86     | gy. s. bk. sp.       | Do.                      |
| 3498                    | July 17 | 56 13 00  | 169 36 00 | 45            | 38.6         | 142    | fine. gy. s. g.      | Do.                      |
| 3499                    | July 17 | 56 12 00  | 169 35 00 | 46            | 38.5         | 162    | fine. gy. s. g.      | L. B. T.                 |
| 3500                    | July 17 | 56 02 00  | 169 30 00 | 46            | 38.6         | 121    | fine. gy. s. g.      | L. B. T., surf.          |
| 3501                    | July 17 | 55 51 00  | 169 18 00 | 47            | 36.9         | 688    | gn. m.               | Do.                      |
| 3502                    | July 17 | 55 38 00  | 169 00 00 | 46            |              | 368    | gn. m. dk. s.        | Do.                      |
| 3503                    | July 28 | 57 06 15  | 170 11 00 | 43            | 37.9         | 17     | gn. m. fn. s.        | S. B. T.                 |
| 3504                    | July 28 | 56 57 00  | 169 27 00 | 45            | 37.8         | 34     | fine. gy. s. bk. sp. | L. B. T.                 |
| 3505                    | July 28 | 57 09 00  | 168 17 00 | 44            | 38.1         | 44     | fine. gy. s.         | Do.                      |
| 3506                    | July 29 | 57 33 00  | 165 55 00 | 42            | 32           | 36     | gy. s. m.            | Do.                      |
| 3507                    | July 29 | 57 43 00  | 164 42 00 | 43            | 37.5         | 31     | fine. gy. s.         | L. B. T., surf.          |
| 3508                    | July 29 | 58 33 00  | 164 49 00 | 41            | 42           | 23     | fine. gy. s. sh.     | Do.                      |
| 3509                    | July 31 | 57 00 00  | 169 43 00 | 43            | 40.8         | 35     | fine. gy. s. sh.     | R. D.                    |
| 3510                    | Aug. 1  | 57 12 30  | 169 51 00 | 43            | 40.1         | 27     | sh. bk. s.           | L. B. T.                 |
| 3511                    | Aug. 1  | 57 32 00  | 169 38 00 | 44            | 37.2         | 39     | fine. s. dk. m.      | Do.                      |
| 3512                    | Aug. 1  | 57 49 30  | 169 27 00 | 45            | 36.6         | 38     | fine. s. gn. m.      | R. D.                    |
| 3513                    | Aug. 1  | 58 27 00  | 169 01 00 | 43            |              | 35     | fine. s. gn. m.      | L. B. T., mud bag.       |
| 3514                    | Aug. 2  | 59 22 00  | 168 21 00 | 40            | 40.8         | 21     | fine. gy. s.         | L. B. T.                 |
| 3515                    | Aug. 2  | 59 59 00  | 167 53 00 | 42            | 41.8         | 13     | fine. gy. s.         | L. B. T., mud bag.       |
| 3516                    | Aug. 2  | 60 28 00  | 168 08 00 | 44            | 43.2         | 17     | fine. gy. s.         | L. B. T.                 |
| 3517                    | Aug. 2  | 60 27 00  | 169 04 00 | 41            | 40.3         | 24     | fine. gy. s.         | L. B. T., surf.          |
| 3518                    | Aug. 3  | 60 22 00  | 171 42 00 | 42            | 33.9         | 36     | gn. m.               | Do.                      |
| 3519                    | Aug. 3  | 60 06 00  | 171 25 00 | 42            | 31.1         | 37     | bk. m. fine. s.      | Do.                      |
| 3520                    | Aug. 3  | 59 28 00  | 170 57 00 | 43            | 32.2         | 38     | gn. m. fine. s.      | L. B. T., mud bag, surf. |
| 3521                    | Aug. 3  | 59 09 00  | 170 48 00 | 43            | 31.9         | 40     | gn. m. fine. s.      | L. B. T., surf. tow net. |
| 3522                    | Aug. 4  | 57 58 00  | 170 09 00 | 44            | 35.7         | 41     | crs. gy. s. g.       | L. B. T., mud bag, surf. |
| 3523                    | Aug. 4  | 57 39 00  | 170 02 00 | 45            | 38           | 39     | gn. m. fine. s.      | L. B. T., surf.          |
| 3524                    | Aug. 4  | 57 24 00  | 169 56 00 | 45            | 40.3         | 36     | gy. s. p.            | Do.                      |
| 3525                    | Aug. 4  | 57 21 00  | 170 05 00 | 45            | 41.6         | 29     | bk. s. sh.           | R. D.                    |
| 3526                    | Aug. 5  | 57 31 00  | 170 57 00 | 44            | 38.9         | 49     | dk. m. fine. s.      | Do.                      |
| 3527                    | Aug. 5  | 57 48 00  | 171 21 00 | 44            | 38           | 52     | gn. m.               | L. B. T., surf.          |
| 3528                    | Aug. 5  | 58 19 30  | 172 02 00 | 45            | 35.9         | 55     | dk. gn. m. fine. s.  | L. B. T.                 |
| 3529                    | Aug. 5  | 58 36 00  | 172 24 00 | 45            | 36.1         | 56     | gn. m.               | Do.                      |
| 3530                    | Aug. 6  | 59 39 00  | 173 53 00 | 44            | 34.9         | 59     | dk. gn. m. fine. s.  | L. B. T., surf.          |
| 3531                    | Aug. 6  | 59 55 00  | 174 17 00 | 46            | 35.1         | 59     | gn. m.               | Do.                      |
| 3532                    | Aug. 6  | 59 12 00  | 175 39 00 | 44            | 34.8         | 77     | dk. gn. m. fine. s.  | Do.                      |
| 3533                    | Aug. 7  | 57 34 00  | 173 33 00 | 46            | 39.2         | 70     | gy. s. bk. sp.       | L. B. T.                 |
| 3534                    | Aug. 8  | 57 03 00  | 171 19 00 | 45            | 38.1         | 59     | gn. m.               | Do.                      |
| 3535                    | Aug. 8  | 57 02 00  | 170 46 00 | 45            | 39           | 52     | gn. m. fine. s.      | Do.                      |
| 3536                    | Aug. 8  | 57 05 00  | 170 35 00 | 45            | 42.4         | 40     | gn. m. fine. s.      | Do.                      |
| 3537                    | Aug. 9  | 54 45 00  | 169 06 00 | 43            | 38           | 49     | fine. gy. s.         | L. B. T., surf.          |
| 3538                    | Aug. 9  | 56 41 00  | 168 29 00 | 46            | 38           | 59     | gn. m. s.            | Do.                      |
| 3539                    | Aug. 9  | 56 34 00  | 167 19 00 | 45            | 38.9         | 57     | gn. m. s.            | L. B. T., mud bag, surf. |
| 3540                    | Aug. 9  | 56 27 00  | 166 08 00 | 45            | 36           | 51     | gn. m. fine. s.      | L. B. T., surf.          |
| 3541                    | Aug. 10 | 56 14 00  | 164 08 00 | 46            | 36.1         | 49     | bk. m. fine. s.      | L. B. T., mud bag, surf. |
| 3542                    | Aug. 10 | 56 10 00  | 163 26 00 | 47            | 39.2         | 49     | dk. m. fine. s.      | L. B. T., surf.          |
| 3543                    | Aug. 18 | 56 41 00  | 169 39 00 | 44            | 42.7         | 43     | bk. s. sh.           | Do.                      |
| 3544                    | Aug. 18 | 56 50 00  | 169 59 00 | 44            | 41.1         | 41     | fine. gy. s. sh.     | Do.                      |
| 3545                    | Aug. 21 | 56 15 00  | 171 33 00 | 48            | 36           | 1,020  | gn. m. fine. s. c.   | Agassiz dredge, surf.    |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.      | Date.   | Position.             |                    | Surface temp. | Bottom temp. | Depth. | Kind of bottom.     | Instrument used, etc.                    |
|-----------------|---------|-----------------------|--------------------|---------------|--------------|--------|---------------------|--|
|                 |         | Lat. N.               | Long. W.           |               |              |        |                     |  |
| Bering Sea.     |         |                       |                    |               |              |        |                     |  |
| 1893.           |         |                       |                    |               |              |        |                     |  |
| 3546            | Aug. 31 | 54 12 00              | 165 42 00          | 47            | 45.6         | 36     | g. bk. s.           | L. B. T., mud bag.                       |
| 3547            | Aug. 31 | 54 16 00              | 165 45 00          | 47            | 45           | 51     | fne. bk. s.         | L. B. T., surf.                          |
| 3548            | Sept. 1 | 54 44 00              | 165 42 00          | 47            | 39.5         | 91     | bk. s.              | Do.                                      |
| 3549            | Sept. 1 | 55 00 00              | 166 10 00          | 49            | 40.1         | 78     | fne. bk. s.         | Do.                                      |
| 3550            | Sept. 1 | 55 24 00              | 167 02 00          | 48            | 39           | 76     | br. m.              | Do.                                      |
| 3551            | Sept. 1 | 55 36 00              | 167 28 00          | 47            | 39.1         | 74     | gn. m.              | Do.                                      |
| 3552            | Sept. 2 | 56 28 00              | 169 28 00          | 47            | 39.8         | 54     | bk. s. rky          | L. B. T.                                 |
| 3553            | Sept. 2 | 56 28 00              | 169 46 00          | 48            | 39.5         | 51     | fne. gy. s. m.      | L. B. T., surf.                          |
| 3554            | Sept. 2 | 56 34 00              | 170 19 00          | 47            | 39.5         | 62     | gn. m.              | Do.                                      |
| 3555            | Sept. 2 | 56 45 00              | 170 18 00          | 46            | 40.2         | 57     | gn. m.              | Do.                                      |
| 3556            | Sept. 2 | 56 57 30              | 170 33 00          | 46            | 41           | 49     | gn. m. fne. s.      | Do.                                      |
| 3557            | Sept. 2 | 57 04 00              | 170 24 00          | 45            | 45           | 26     | s. bk. sp.          | L. B. T.                                 |
| 3558            | Sept. 3 | 56 58 00              | 170 09 00          | 45            | 42.9         | 25     | s. dk. sp. rky      | Do.                                      |
| 3559            | Sept. 3 | 56 56 00              | 169 52 00          | 46            | 42.5         | 39     | gy. s. brk. sh.     | L. B. T., mud bag, surf.                 |
| 3560            | Sept. 3 | 56 40 00              | 169 20 00          | 45            | 40.7         | 43     | fne. gy. s. bk. sp. | L. B. T.                                 |
| 3561            | Sept. 3 | 56 31 00              | 169 17 00          | 45            | 40.7         | 48     | gy. s. bk. sp.      | Do.                                      |
| San Diego Bay.  |         |                       |                    |               |              |        |                     |  |
| 3562            | Mar. 19 | San Diego Bay, Cal. a |                    | 58            | -----        | 7      | s. bk. sh.          | Boat dredge.                             |
| 3563            | Mar. 19 | do                    | do                 | 56            | -----        | 6.5    | fne. s. bk. sh.     | Do.                                      |
| 3564            | Mar. 19 | do                    | do                 | 58            | -----        | 5      | fne. s. m. bk. sh.  | Do.                                      |
| 3565            | Mar. 19 | do                    | do                 | 58            | -----        | 4.5    | fne. s. m. bk. sh.  | Do.                                      |
| 3566            | Mar. 19 | do                    | do                 | 58            | -----        | 3      | fne. s. bk. sh.     | Do.                                      |
| 3567            | Mar. 21 | do                    | do                 | 57            | -----        | 3      | fne. s. bk. sh.     | Do.                                      |
| 3568            | Mar. 21 | do                    | do                 | 57            | -----        | 4      | hrd. bk. sh.        | Do.                                      |
| 3569            | Mar. 21 | do                    | do                 | 57            | -----        | 6      | fne. s. bk. sh.     | Do.                                      |
| 3570            | Mar. 21 | do                    | do                 | 57            | -----        | 2      | fne. s. oyster sh.  | Do.                                      |
| 3571            | Mar. 21 | do                    | do                 | 57            | -----        | 2      | hrd.                | Do.                                      |
| 3572            | Mar. 21 | do                    | do                 | 56            | -----        | 2      | m. fne. s.          | Do.                                      |
| 3573            | Mar. 21 | do                    | do                 | 56            | -----        | 1.5    | m. s.               | Boat beam trawl.                         |
| 3574            | Mar. 21 | do                    | do                 | 57            | -----        | 5.75   | fne. s.             | Do.                                      |
| 3575            | Mar. 21 | do                    | do                 | 57            | -----        | 6.75   | fne. s.             | Do.                                      |
| 3576            | Mar. 21 | do                    | do                 | 58            | -----        | 5      | fne. s. bk. sh.     | Do.                                      |
| 3577            | Mar. 21 | do                    | do                 | 57            | -----        | 6      | fne. s. bk. sh.     | Do.                                      |
| 3578            | Mar. 21 | do                    | do                 | 56            | -----        | 6      | fne. s. bk. sh.     | Do.                                      |
| 3579            | Mar. 22 | do                    | do                 | 53            | -----        | 9      | hrd.                | Do.                                      |
| 3580            | Mar. 22 | do                    | do                 | 53            | -----        | 7      | hrd.                | Do.                                      |
| 3581            | Mar. 22 | do                    | do                 | 53            | -----        | 12     | fne. s. r.          | Do.                                      |
| 3582            | Mar. 22 | do                    | do                 | 54            | -----        | 6.75   | fne. s. r.          | Do.                                      |
| 3583            | Mar. 22 | do                    | do                 | 53            | -----        | 4      | fne. s. r.          | Do.                                      |
| 3584            | Mar. 22 | do                    | do                 | 54            | -----        | 8      | fne. s. r.          | Do.                                      |
| 3585            | Mar. 24 | do                    | do                 | 57            | -----        | 4      | fne. gy. s.         | Do.                                      |
| 3586            | Mar. 24 | do                    | do                 | 57            | -----        | 4      | fne. gy. s.         | Do.                                      |
| 3587            | Mar. 24 | do                    | do                 | 57            | -----        | 3      | fne. gy. s.         | Do.                                      |
| 3588            | Mar. 24 | do                    | do                 | 57            | -----        | 2.5    | r. oyster sh.       | Do.                                      |
| 3589            | Mar. 24 | do                    | do                 | 57            | -----        | 3      | r. oyster sh.       | Do.                                      |
| 3590            | Mar. 24 | do                    | do                 | 57            | -----        | 3.5    | r. bk. sh.          | Do.                                      |
| 3591            | Mar. 24 | do                    | do                 | 57            | -----        | 4.5    | r. bk. sh.          | Do.                                      |
| Off Washington. |         |                       |                    |               |              |        |                     |  |
| 3592            | Apr. 30 | 48 10 00              | 122 45 30          | 46            | -----        | 27     | r. s.               | S. B. T.                                 |
| 3593            | Apr. 30 | 48 11 30              | 122 48 00          | 46            | 46           | 37     | rky                 | Ship's dredge.                           |
| 3594            | Apr. 30 | 48 12 00              | 122 50 00          | 46            | 46           | 36     | s. p.               | Tangles.                                 |
| 3595            | Apr. 30 | 48 13 00              | 122 59 30          | 46            | 45           | 49     | rky. g. s.          | Do.                                      |
| 3596            | Apr. 30 | 48 14 30              | 122 58 00          | 46            | 44           | 81     | bu. m.              | L. B. T.                                 |
| 3597            | Apr. 30 | 48 15 00              | 123 00 00          | 46            | 45           | 67     | crs. bk. s.         | Do.                                      |
| Bering Sea.     |         |                       |                    |               |              |        |                     |  |
| 1895.           |         |                       |                    |               |              |        |                     |  |
| 3598            | June 8  | 52 01 00              | Long. E. 177 34 00 | 40            | -----        | 34     | bk. g.              | L. B. T.                                 |
| 3599            | June 9  | 52 05 00              | 177 40 00          | 42            | -----        | 55     | rky. fne. s. sh.    | Do.                                      |
| 3600            | June 26 | 55 06 00              | Long. W. 163 28 00 | 41            | 40           | 9      | fne. dk. vol. s.    | L. B. T., surf.                          |
| 3601            | Aug. 5  | 55 06 00              | 169 08 00          | 46            | 35.8         | 1,044  | gn. m. fne. s.      | L. T. B., surface and intermediate nets. |
| 3602            | Aug. 10 | 56 32 00              | 172 40 00          | 44            | 37.1         | 81     | gn. m. s.           | L. B. T., surface net.                   |
| 3603            | Aug. 11 | 55 23 00              | 170 31 00          | 45            | 35.1         | 1,771  | bn. oz.             | L. B. T., surface and intermediate nets. |
| 3604            | Aug. 12 | 54 54 00              | 168 59 00          | 45            | 35.2         | 1,401  | gn. oz.             | Do.                                      |
| 3605            | Aug. 13 | 55 17 00              | 167 34 00          | 44            | 37.1         | 91     | gn. m. s.           | Do.                                      |

a All bearings are magnetic. Chart used, C. S. No. 5106.

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No.                      | Date.    | Position.   |           | Surface temp. | Bottom temp. | Depth.    | Kind of bottom.         | Instrument used, etc.                    |
|---------------------------------|----------|---|-----------|---------------|--------------|-----------|-------------------------|--|
|                                 |          | Lat. N.   | Long. W.  |               |              |           |                         |  |
| Bering Sea.                     |          |   |           |               |              |           |                         |  |
|                                 | 1895.    | ° ' "   | ° ' "     | ° F.          | ° F.         | Fms.      |                         |  |
| 3606                            | Aug. 13  | 55 27 00  | 167 47 00 | 45            | 38.1         | 87        | gn. m. fine s. ....     | L. B. T., surface and intermediate nets. |
| 3607                            | Aug. 13  | 54 11 30  | 167 25 00 | 45            | 35.9         | 987       | gn. m. bk. lav. s. .... | Do.                                      |
| 3608                            | Aug. 20  | 55 19 00  | 168 11 00 | 45            | 37.8         | 276       | gy. s. ....             | Do.                                      |
| 3609                            | Aug. 21  | 55 35 00  | 168 20 00 | 46            | 37.9         | 74        | gn. m. s. ....          | Do.                                      |
| 3610                            | Aug. 22  | 55 58 00  | 167 16 00 | 47            | 36.8         | 75        | gn. m. ....             | Do.                                      |
| 3611                            | Aug. 22  | 56 45 00  | 167 25 00 | 46            | 34.6         | 50        | gn. m. s. ....          | Do.                                      |
| 3612                            | Sept. 30 | Bellingham, Wash.   |           | 52            |              | 11        | gn. m. ....             | S. B. T.                                 |
| 1896.                           |          |   |           |               |              |           |                         |  |
| 3613                            | Mar. 31  | San Diego Bay, Cal.   |           | 63            |              | 5         | m. sh. ....             | Boat beam trawl.                         |
| 3614                            | Mar. 31  | do.   |           | 63            |              | 4.5       | m. sh. ....             | Do.                                      |
| 3615                            | Mar. 31  | do.   |           | 63            |              | 5         | m. sh. ....             | Do.                                      |
| 3616                            | Mar. 31  | do.   |           | 63            |              | 5         | m. sh. ....             | Do.                                      |
| 3617                            | Mar. 31  | do.   |           | 63            |              | 5.5       | m. sh. ....             | Do.                                      |
| 3618                            | Mar. 31  | do.   |           | 63            |              | 4.5       | m. sh. ....             | Do.                                      |
| 3619                            | Mar. 31  | do.   |           | 63            |              | 4         | m. sh. ....             | Do.                                      |
| 3620                            | Mar. 31  | do.   |           | 63            |              | 6         | m. sh. ....             | Do.                                      |
| 3621                            | Apr. 1   | do.   |           | 61            |              | 6.5       | m. s. ....              | Do.                                      |
| 3622                            | Apr. 1   | do.   |           | 61            |              | 7         | m. s. ....              | Do.                                      |
| 3623                            | Apr. 1   | do.   |           | 63            |              | 6.25      | s. ....                 | Do.                                      |
| 3624                            | Apr. 1   | do.   |           | 63            |              | 5         | m. s. ....              | Do.                                      |
| 3625                            | Apr. 1   | do.   |           | 63            |              | 6         | m. s. ....              | Do.                                      |
| 3626                            | Apr. 1   | do.   |           | 63            |              | 7         | m. s. ....              | Do.                                      |
| West of Cortez and Tanner banks |          |   |           |               |              |           |                         |  |
| 3627                            | Apr. 13  | 32 44 00  | 119 32 00 | 55            | 39.2         | 776 Feet. | gn. m. s. ....          | S. B. T.                                 |
| 3628                            | June 1   | Lower Bay of San Francisco.   |           | 57            |              | 18        | sft. gn. m. ....        | Oyster dredge.                           |
| 3629                            | June 1   | do.   |           | 57            |              | 19.5      | sft. gn. m. ....        | Do.                                      |
| 3630                            | June 1   | do.   |           | 58            |              | 15        | sft. gn. m. ....        | Do.                                      |
| 3631                            | June 1   | do.   |           | 58            |              | 25        | gn. m. ....             | Do.                                      |
| 3632                            | June 1   | do.   |           | 60            |              | 18        | gn. m. ....             | Do.                                      |
| 3633                            | June 1   | do.   |           | 62            |              | 18        | gn. m. ....             | Do.                                      |
| Bering Sea.                     |          |   |           |               |              |           |                         |  |
| 3634                            | July 7   | 54 51 00  | 167 27 00 | 43            | 36.3         | 664       | w. vol. s. ....         | L. B. T. surf.                           |
| 3635                            | July 10  | Zapadne St. George Bay.   | Island.   | 43            |              | 24        | bk. s. sky. ....        | L. B. T.                                 |
| 3636                            | July 18  | 57 05 40  | 170 25 00 | 38            | 42.2         | 18        | rky. ....               | Do.                                      |
| 3637                            | July 18  | 57 06 30  | 170 28 00 | 38            | 39.0         | 32        | crs. g. ....            | Do.                                      |
| 3638                            | July 18  | 57 07 30  | 170 28 15 | 38            | 38.7         | 33        | g. ....                 | Do.                                      |
| 3639                            | July 18  | 57 05 45  | 170 30 00 | 38            | 38.8         | 27        | fine. gy. s. ....       | Do.                                      |
| 3640                            | July 18  | 57 06 00  | 170 32 00 | 38            | 39.0         | 26        | fine. gy. s. ....       | Do.                                      |
| Avatcha Bay, Kamchatka.         |          |   |           |               |              |           |                         |  |
|                                 |          |   | Long. E.  |               |              |           |                         |  |
| 3641                            | Aug. 19  | 52 58 00  | 158 36 00 | 45            | 47.7         | 16        | bk. m. ....             | L. B. T.                                 |
| 3642                            | Aug. 19  | 52 57 45  | 158 36 30 | 47            |              | 16        | bk. m. ....             | Do.                                      |
| Southeast coast of Kamchatka.   |          |   |           |               |              |           |                         |  |
| 3643                            | Aug. 20  | 51 16 00  | 158 03 00 | 49            | 31.7         | 100       | bk. s. p. ....          | L. B. T.                                 |
| 3644                            | Aug. 20  | 51 09 00  | 157 48 00 | 51            | 33.1         | 96        | bk. s. ....             | Do.                                      |
| 3645                            | Aug. 31  | To westward of Robben Island, Okhotsk Sea 2 to 10 miles distant. Having no chart, nearer location can not be given. |           | 47            |              | 10        | s. ....                 | Do.                                      |
| 3646                            | Aug. 31  |   |           | 47            |              | 18        | fine. gy. s. ....       | Do.                                      |
| 3647                            | Aug. 31  |   |           | 47            |              | 20        | fine. gy. s. ....       | Do.                                      |
| 3648                            | Aug. 31  |   |           | 47            |              | 20        | fine. gy. s. ....       | Do.                                      |
| 3649                            | Aug. 31  |   |           | 50            |              | 25        | fine. dk. s. ....       | Do.                                      |
| 3650                            | Aug. 31  |   |           | 50            |              | 28        | bn. m. s. ....          | Do.                                      |
| 3651                            | Aug. 31  |   |           | 47            |              | 20        | fine. gy. s. ....       | Do.                                      |
| Off Shana, Iturup Island.       |          |   |           |               |              |           |                         |  |
| 3652                            | Sept. 6  | 45 15 30  | 147 53 00 | 56            |              | 14        | yl. c. ....             | L. B. T.                                 |
| 3653                            | Sept. 6  | 45 14 00  | 147 52 30 | 57            | 56.5         | 18        | dk. gy. s. ....         | Do.                                      |
| Off Japan.                      |          |   |           |               |              |           |                         |  |
| 3654                            | Sept. 19 | Hakodate Bay.   |           | 67            |              | 10.5      | gn. m. s. ....          | L. B. T.                                 |
| 3655                            | Sept. 19 | do.   |           | 67            |              | 12        | gn. m. s. ....          | Do.                                      |
| 3656                            | Sept. 19 | do.   |           | 67            |              | 11.5      | gn. m. s. ....          | Do.                                      |
| 3657                            | Sept. 19 | do.   |           | 67            |              | 13.5      | fine. gy. s. ....       | Do.                                      |
| 3658                            | Sept. 19 | do.   |           | 67            |              | 22        | fine. gy. s. ....       | Do.                                      |
| 3659                            | Sept. 19 | do.   |           | 65            |              | 15.5      | fine. gy. s. ....       | Do.                                      |
| 3660                            | Sept. 19 | do.   |           | 65            |              | 14.5      | fine. gy. s. ....       | Do.                                      |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No. | Date.            | Position.                                       |          | Surface temp. | Bottom temp. | Depth.              | Kind of bottom. | Instrument used, etc. |
|------------|------------------|---|----------|---------------|--------------|---------------------|-----------------|-----------------------|
|            |                  | Lat. N.   | Long. E. |               |              |                     |                 |                       |
|            |                  | <i>Off Japan.</i>                               |          |               |              |                     |                 |                       |
| 3661       | 1896.<br>Oct. 13 | ° ' "   ° ' "                                   | ° F.     | ° F.          | <i>Fms.</i>  |                     |                 |                       |
|            |                  | Off Uki Shima,<br>Gulf of Tokyo.                | 72       | 48.0          | 169          | m. p.-----          | L. B. T.        |                       |
|            |                  | Lat. N.   Long. W.                              |          |               |              |                     |                 |                       |
|            |                  | <i>Santa Catalina Is-<br/>land, California.</i> |          |               |              |                     |                 |                       |
| 3662       | 1897.<br>Apr. 8  | 1 1/2'' off Avalon, Da-<br>kins Cove.           | 58       | 51.7          | 47           | fne. gy. s.-----    | L. B. T.        |                       |
| 3663       | Apr. 8           | Near preceding<br>station.                      | 58       | 52.5          | 47           | fne. gy. s.-----    | Do.             |                       |
| 3664       | Apr. 8           | 2' off Avalon, Da-<br>kins Cove.                | 58       | 49.7          | 80           | fne. gy. s.-----    | Do.             |                       |
| 3665       | Apr. 9           | 33 17 00   118 24 00                            | 61       | -----         | 59           | fne. gy. s.-----    | Do.             |                       |
|            |                  | <i>Monterey Bay and<br/>vicinity.</i>           |          |               |              |                     |                 |                       |
| 3666       | Apr. 13          | 36 45 00   121 53 00                            | 55       | -----         | 68           | m. s. bldr -----    | L. B. T.        |                       |
| 3667       | Apr. 13          | 36 45 00   121 52 00                            | 55       | 47.7          | 90           | m. s. bldr -----    | Do.             |                       |
| 3668       | Apr. 13          | 36 40 00   121 53 00                            | 56       | 48.7          | 39           | s. mica -----       | Do.             |                       |
| 3669       | Apr. 16          | 36 47 00   122 11 00                            | 57       | 42.7          | 278          | gn. m. fne. s.----- | Do.             |                       |
| 3670       | Apr. 17          | 36 43 00   122 12 00                            | 54       | 37.8          | 581          | gn. m. s. -----     | Do.             |                       |
| 3671       | Apr. 21          | 37 00 00   122 20 00                            | 50       | -----         | 56           | gn. m. s. -----     | Do.             |                       |
| 3672       | Apr. 24          | 37 37 00   123 02 00                            | 49       | 49.0          | 68           | s. co. r.-----      | Do.             |                       |
|            |                  | <i>Flattery Bank.</i>                           |          |               |              |                     |                 |                       |
| 3673       | May 14           | 48 21 45   124 50 30                            | 47       | 45.0          | 77           | gn. m. s. -----     | L. B. T.        |                       |

a Nos. 3674 to 3680 missing from the record.

## Record of dredging and trawling stations of the Albatross (Tropical Pacific).

| Numbers.                           |       | Date.          | Position.                                       |           | Surface temp. | Bottom temp. | Depth.   | Kind of bot+om.          | Instrument used, etc. |
|------------------------------------|-------|----------------|---|-----------|---------------|--------------|----------|--------------------------|-----------------------|
| Serial.                            | A. A. |                | Lat. N.   | Long. W.  |               |              |          |                          |                       |
| <i>San Francisco to Marquesas.</i> |       |                |   |           |               |              |          |                          |                       |
| 1899.                              |       |                |   |           |               |              |          |                          |                       |
| 3681                               | 2     | Aug. 27        | 28 23 00  | 126 57 00 | 66            | 34.6         | 2,368    | lt. br. vol. oz. ....    | 8' Tnr.               |
| 3682                               | 10    | Sept. 2        | 16 38 00  | 136 14 00 | 79            | -----        | 3,088    | no spec. ....            | 5½' Blk.              |
| 3683                               | 13    | Sept. 5        | 9 57 00   | 137 47 00 | 82            | -----        | 2,690    | rad. oz. ....            | Do.                   |
| 3684                               | 17    | Sept. 10       | 0 50 00   | 137 54 00 | 80            | -----        | 2,463    | gy. yl. glob. oz. ....   | Do.                   |
|                                    |       |                | Lat. S.   |           |               |              |          |                          |                       |
| 3685                               | 25    | Sept. 14       | Off Marquesas Islands.                          |           | 80            | 38.0         | 830      | vol. s. glob. ....       | 8' Tnr.               |
| 3686                               | 31    | Sept. 19       | 12 20 00  | 144 15 00 | 79            | 35.0         | 2,700    | red. c. ....             | 5½' Blk.              |
| 3687                               | 74    | Oct. 5         | Off Pt. Venus, Tahiti Island, S. 82°, E. 4.8 m. |           | 79            | -----        | 725      | ful. vol. s. yl. m. .... | 8' Tnr.               |
| <i>Paumotu Islands.</i>            |       |                |   |           |               |              |          |                          |                       |
| 3688                               | 133   | Oct. 28        | N. W. Pt. Marokau, East 2 m.                    |           | 78            | 34.5         | 742      | pter. oz. mang. ....     | 8' Tnr.               |
| 3689                               | 134   | Oct. 28        | N. W. Pt. Marokau, N. 40°, E. 4 m.              |           | 79            | 37.6         | 807      | co. s. mang. ....        | Tangles.              |
| 3690                               | 139   | Oct. 29        | N. W. Face Hao Atoll, East 2 m.                 |           | 79            | 37.6         | 812      | co. s. ....              | 5½' Blk.              |
| 3691                               | 173   | Nov. 4         | 18 55 00  | 146 32 00 | 78            | 34.8         | 2,440    | vol. m. glob. co. part.  | Do.                   |
| <i>Tonga to Ellice Ids.</i>        |       |                |   |           |               |              |          |                          |                       |
| 3692                               | 183   | Nov. 24        | 19 04 00  | 167 41 00 | 80            | 33.9         | 2,472    | rd. c. rad. oz. ....     | Do.                   |
| 3693                               | 185   | Nov. 27        | 21 18 00  | 173 31 00 | 77            | -----        | 4,173    | no spec. ....            | 4' Blk.               |
|                                    |       |                | Long. E.  |           |               |              |          |                          |                       |
| 3694                               | 194   | Dec. 21        | 12 43 00  | 179 50 00 | 85            | 35.6         | 1,445    | glob. oz. ....           | 8' Tnr.               |
|                                    |       |                | Lat. N.   |           |               |              |          |                          |                       |
| <i>Off Honshu Island, Japan.</i>   |       |                |   |           |               |              |          |                          |                       |
| 3695                               | ----- | 1900.<br>May 4 | Tsuragi Saki Light, S. 80°, W. 4.3 m.           |           | 64            | -----        | 259; 110 | gn. m. fne. s. ....      | 8' Tnr.               |
| 3693                               | ----- | May 5          | Manazuru Zaki, N. 70°, W. 4.7 m.                |           | 65            | 39.0         | 501; 749 | gn. m. vol. a. s. ....   | Do.                   |

## Record of dredging and trawling stations of the Albatross—Continued.

| Serial No. | Date.        | Position.                                  | Surface temp. | Depth.         | Kind of bottom.           | Instrument used, etc.   |
|------------|--------------|--|---------------|----------------|---------------------------|-------------------------|
|            | <b>1900.</b> | <i>Off Honshu Island, Japan</i>            | <i>° F.</i>   | <i>Fms.</i>    |                           |                         |
| 3697       | May 5        | Manazuru Zaki, 26° W. 6.0 m.               | 65            | 265; 120       | gy. m. vol. s.            | 8' Tnr.                 |
| 3698       | May 5        | Manazuru Zaki, N. 8°, W. 4.5 m.            | 65            | 153            | gn. m. vol. a. s.         | Do.                     |
| 3699       | May 6        | Entr. Port Arari, S. 74°, E. 5.6 m.        | 60            | 726; 400       | gy. m. vol. part          | Do.                     |
| 3700       | May 7        | Seno Umi, N. 4°, E. 2 m.                   | 63            | 63             | vol. m. s.                | Gr ap n e l s, tangles. |
| 3701       | May 7        | Seno Umi, N. 10°, W. 2.3 m.                | 64            | 73; 41         | vol. m. s. r.             | 5 1/2' Blk.             |
| 3702       | May 7        | Seno Umi, N. 13°, W. 1.5 m.                | 64            | 41; 31         | vol. m. s. r.             | Gr ap n e l swab.       |
| 3703       | May 7        | Seno Umi, N. 16°, E. 5/8 m.                | 64            | 31             | vol. s. g.                | 5 1/2' Blk.             |
| 3704       | May 7        | Seno Umi, S. 30°, E. 1.1 m.                | 64            | 94; 150        | fne. vol. s.              | Do.                     |
| 3705       | May 7        | Seno Umi S. 18°, W. 5.3 m.                 | 64            | Did not sound. |                           | Surf.                   |
| 3706       | May 8        | Entr. Port Heda, N. 86°, E. 2 m.           | 64            | 337            | gn. vol. m.               | 8' Tnr.                 |
| 3707       | May 8        | Ose Zaki, S. 53°, W. 2 1/4 m.              | 65            | 63; 75; 70     | vol. s. a. g.             | Do.                     |
| 3708       | May 8        | Ose Zaki, S. 55°, W. 2.25 m.               | 65            | 60; 70         | gn. m. vol. s. a.         | Do.                     |
| 3709       | May 10       | Spithead Shimizu Harbor, N. 77°, W. 1.5 m. | 63            | 173; 260       | stf. bl. vol. m. r.       | 5 1/2' Blk.             |
| 3710       | May 10       | Entr. Port Heda, N. 88°, E. 6.5 m.         | 62            | 800; 677       | vol. m. s.                | Do.                     |
| 3711       | May 10       | Entr. Port Heda, S. 63°, E. 6.2 m.         | 64            | 677; 500       | vol. m. s.                | Do.                     |
| 3712       | May 10       | Ose Zaki, S. 72°, E. 6.5 m.                | 64            | 500; 600       | vol. m. s.                | Surf.                   |
| 3713       | May 11       | Ose Zaki, S. 81°, W. 4.2 m.                | 65            | 45; 48         | vol. s. sh. r.            | 8' Tnr.                 |
| 3714       | May 11       | Ose Zaki, S. 82°, W. 3.3 m.                | 65            | 48; 60         | vol. s. sh. r.            | Do.                     |
| 3715       | May 11       | Ose Zaki, S. 56°, W. 1.6 m.                | 65            | 68; 65         | vol. s. sh. r.            | 8' Tnr.                 |
| 3716       | May 11       | Ose Zaki, S. 36°, W. 0.8 m.                | 66            | 65; 125        | vol. s. sh. r.            | Do.                     |
| 3717       | May 11       | Ose Zaki, S. 34°, E. 0.8 m.                | 66            | 75; 100; 63    | vol. s. sh. r.            | Do.                     |
| 3718       | May 11       | Ose Zaki, S. 37°, W. 1.2 m.                | 65            | 65             | vol. s. sh. r.            | 5 1/2' Blk.             |
| 3719       | May 11       | Ose Zaki, S. 13°, W. 1.5 m.                | 66            | 90; 70         | vol. s. sh. r.            | 8' Tnr.                 |
| 3720       | May 11       | Ose Zaki, S. 36°, W. 0.8 m.                | 66            | 63             | vol. s. sh.               | Do.                     |
| 3721       | May 12       | Oi Gawa, N. 49°, W. 2.8 m.                 | 64            | 207; 250       | gy. m.                    | Do.                     |
| 3722       | May 15       | Yokkaichi Lt., S. 89°, W. 3.7 m.           | 63            | 9              | m. s. p. sh.              | Do.                     |
| 3723       | May 15       | Yokkaichi Lt., N. 23°, W. 6.7 m.           | 62            | 13; 16         | m. s. p. sh.              | Do.                     |
| 3724       | May 15       | Noma Saki, S. 86°, E. 5.7 m.               | 64            | 20             | m. s. p. sh.              | Do.                     |
| 3725       | May 15       | Noma Saki, N. 18°, E. 8.8 m.               | 64            | 13             | s. sh. g.                 | Do.                     |
| 3726       | May 15       | Takamatsu Zaki, N. 5°, W. 5.7 m.           | 63            | 26             | gy. vol. s.               | Do.                     |
| 3727       | May 16       | Omai Zaki Lt., N. 17°, E. 9.7 m.           | 62            | 34             | m. crs. s. blk. sh.       | Do.                     |
| 3728       | May 16       | Omai Zaki Lt., N. 17°, E. 11.25 m.         | 64            | 34             | m. stf. c.                | Do.                     |
| 3729       | May 16       | Omai Zaki Lt., N. 17°, E. 12.7 m.          | 64            | 34             | m. g.                     | Do.                     |
| 3730       | May 16       | Omai Zaki Lt., N. 17°, E. 14.5 m.          | 64            | 34; 37         | m. g. r.                  | Surf.                   |
| 3731       | May 16       | Omai Zaki Lt., N. 17°, E. 16.25 m.         | 64            | 37             | crs. s. brk. sh. r.       | 8' Tnr.                 |
| 3732       | May 16       | Omai Zaki Lt., N. 17°, E. 16.5 m.          | 65            | 41             | crs. s. brk. sh. r.       | 5 1/2' Blk.             |
| 3733       | May 16       | Omai Zaki Lt., N. 24°, E. 9.5 m.           | 64            | 49             | fne. gy. vol. s.          | 8' Tnr.                 |
| 3734       | May 16       | Omai Zaki Lt., N. 25°, E. 11 m.            | 64            | 48; 36         | crs. gy. vol. s. brk. sh. | Do.                     |
| 3735       | May 16       | Omai Zaki Lt., N. 15°, E. 11.4 m.          | 65            | 36             | crs. gy. vol. s. brk. sh. | Do.                     |
| 3736       | May 17       | Ose Zaki, S. 83°, E. 8.1 m.                | 64            | 599; 480       | stf. bl. m. st.           | Do.                     |
| 3737       | May 17       | Ent. Port Heda, N. 49°, E. 1.9 m.          | 65            | 161; 167       | gn. m. vol. s.            | Tangles.                |
| 3738       | May 17       | Ent. Port Heda, N. 84°, E. 1.2 m.          | 67            | 167            | stf. bl. m.               | 8' Tnr.                 |
| 3739       | May 17       | Ose Zaki, S. 25°, W. 0.25 m.               | 65            | 55; 65         | vol. s. sh. r.            | Tangle bar.             |
| 3740       | May 17       | Ose Zaki, S. 50°, W. 0.83 m.               | 65            | 65             | vol. s. sh. p.            | Do.                     |
| 3741       | May 17       | Ose Zaki, S. 29°, W. 0.75 m.               | 66            | 68; 63         | vol. s. sh. p.            | 8' Tnr.                 |
| 3742       | May 19       | Suno Saki, N. 89°, E. 9.8 m.               | 64            | 88; 57         | gy. yl. s.                | 5 1/2' Blk.             |
| 3743       | May 19       | Suno Saki, N. 88°, E. 9.25 m.              | 64            | 57; 46         | gy. yl. s.                | Tangle bar.             |
| 3744       | May 19       | Suno Saki, E. 8.83 m.                      | 64            | 46             | fne. yl. g.               | Do.                     |
| 3745       | May 19       | Suno Saki, N. 89°, E. 8.75 m.              | 64            | 46; 49         | gy. s. g.                 | Do.                     |
| 3746       | May 19       | Suno Saki, N. 87°, E. 8.5 m.               | 64            | 49             | gy. s. p.                 | Tangles.                |
| 3747       | May 19       | Suno Saki, N. 88°, E. 7.9 m.               | 64            | 48; 45         | co. g.                    | Hand lines.             |
| 3748       | May 19       | Suno Saki, S. 88°, E. 8.8 m.               | 64            | 73; 200        | yl. s. rot. co.           | Tangles.                |
| 3749       | May 19       | Suno Saki, S. 85°, E. 9.4 m.               | 64            | 158; 83        | bk. s. sh.                | Do.                     |

*Record of dredging and trawling stations of the Albatross—Continued.*

| Serial No. | Date.        | Position.  | Surface temp. | Depth.      | Kind of bottom.             | Instrument used, etc. |
|------------|--------------|--|---------------|-------------|-----------------------------|-----------------------|
|            | <b>1900.</b> | <i>Off Honshu Island, Japan</i>                                  | <i>° F.</i>   | <i>Fms.</i> |                             |                       |
| 3750       | May 19       | Suno Saki, S. 89°, E. 9.25 m.                                    | 65            | 83; 140     | gy. s. brk. sh. p.          | 4' Blk.               |
| 3751       | May 19       | Suno Saki, S. 87°, E. 8.5 m.                                     | 65            | 148; 140    | gn. m. vol. s.              | Do.                   |
| 3752       | May 19       | Suno Saki, S. 71°, E. 3.25 m.                                    | 66            | 58; 100; 54 | gy. s. g.                   | Tangles.              |
| 3753       | May 19       | Suno Saki, S. 58°, E. 3.6 m.                                     | 66            | 54; 48      | gn. m. s. g.                | Tangle bar.           |
| 3754       | May 19       | Suno Saki, S. 69°, E. 3.2 m.                                     | 67            | 48; 52      | gy. s.                      | 8' Tnr.               |
| 3755       | May 19       | Suno Saki, S. 63°, E. 3.6 m.                                     | 66            | 52; 77      | gy. s. co.                  | Do.                   |
| 3756       | May 19       | Suno Saki, S. 60°, E. 3 m.                                       | 66            | 77; 50      | rot. co.                    | Do.                   |
| 3757       | May 19       | Suno Saki, S. 64°, E. 2.5 m.                                     | 65            | 50; 41      | crs. co. s. g.              | Do.                   |
| 3758       | May 22       | Suno Saki, S. 55°, E. 2.1 m.                                     | 65            | 73; 52      | bl. c. r.                   | Do.                   |
| 3759       | May 22       | Suno Saki, S. 53°, E. 2.3 m.                                     | 66            | 52; 60      | gy. s. fine. g. brk. sh. r. | Do.                   |
| 3760       | May 22       | Suno Saki, S. 53°, E. 3 m.                                       | 66            | 83; 50      | gy. s. g.                   | Do.                   |
| 3761       | May 22       | Suno Saki, S. 55°, E. 2.5 m.                                     | 66            | 35; 42      | gy. s. g.                   | Do.                   |
| 3762       | May 22       | Suno Saki, S. 59°, E. 2.8 m.                                     | 66            | 42; 49      | gy. s. bk. sp. brk. sh.     | Do.                   |
| 3763       | May 22       | Suno Saki, S. 63°, E. 3.3 m.                                     | 66            | 49; 52      | gy. s. brk. sh.             | Do.                   |
| 3764       | May 22       | Suno Saki, S. 64°, E. 2.8 m.                                     | 66            | 44; 50      | fine. g. brk. sh.           | Do.                   |
| 3765       | May 22       | Suno Saki, S. 51°, W. 2 m.                                       | 66            | 68; 45      | gn. m. s.                   | Do.                   |
| 3766       | June 3       | Shioya Saki Lt., N. 78°, W. 108 m.                               | 69            |             |                             | Surf.                 |
| 3767       | June 5       | Oboro Saki, N. 67°, E. 2.3 m.                                    | 67            | 14; 18      | gy. s.                      | 8' Tnr.               |
| 3768       | June 5       | Daikoku Saki, N. 63°, E. 4.25 m.                                 | 64            | 25; 27      | lt. gy. s.                  | Do.                   |
| 3769       | June 5       | Nagane Saki, N. 55°, E. 5.3 m.                                   | 64            | 40; 42      | gn. m. s.                   | Do.                   |
| 3770       | June 5       | Nagane Saki, N. 41°, E. 4.7 m.                                   | 62            | 42; 45      | gn. m. s.                   | Do.                   |
| 3771       | June 5       | Doumiki Saki, N. 19°, W. 4.5 m.                                  | 63            | 61          | gn. m. s.                   | Do.                   |
| 3772       | June 5       | Kinkwasan Lt., N. 34°, W. 7.5 m.                                 | 59            | 79          | gn. m. s.                   | Do.                   |
| 3773       | June 5       | Kinkwasan Lt., N. 49°, W. 5.9 m.                                 | 61            | 78          | bk. s.                      | Do.                   |
| 3774       | June 5       | Kinkwasan Lt., N. 81°, W. 5.4 m.                                 | 61            | 81          | gy. s.                      | Do.                   |
| 3775       | June 5       | Kinkwasan Lt., N. 15°, E. 3.2 m.                                 | 60            | 57          | gn. m. s.                   | Do.                   |
|            |              | <i>Off Kamchatka.</i>  |               |             |                             |                       |
| 3776       | June 21      | Avatcha Village, N. 44°, W. 2 m.                                 | 48            | 13          | sft. gn. m. sh. stk.        | 8' Tnr.               |
| 3777       | June 21      | Avatcha Village, N. 7°, W. 3.8 m.                                | 49            | 13          | sft. gn. m. sh. stk.        | Do.                   |
| 3778       | June 21      | N. Ent. Tareinski Hbr., N. 73°, W. 2.1 m.                        | 49            | 15; 12      | gn. m. s. sh. g.            | Do.                   |
| 3779       | June 21      | N. Ent. Tareinski Hbr., N. 16°, E. 1.6 m.                        | 49            | 12          | gn. m. s. sh. g.            | Do.                   |
| 3780       | June 21      | Id. S. shore Tareineki, S. 43°, W. 0.7 m.                        | 49            | 12          | gn. m. s. sh. g.            | Do.                   |
| 3781       | June 23      | Cape Nalacheff, N. 5°, E. 10.75 m.                               | 50            | 39; 42      | gy. s. g.                   | Do.                   |
| 3782       | June 23      | Cape Nalacheff, N. 5°, W. 10.5 m.                                | 50            | 42          | gy. s. g.                   | Do.                   |
| 3783       | June 25      | S. E. Cape, Copper Id., N. NE. $\frac{1}{4}$ , E. 40 m., approx. | 46            | 1567        | gy. vol. s. gn. m.          | Do.                   |
|            |              | <i>North of Aleutian Islands.</i>                                |               |             |                             |                       |
| 3784       | June 27      | Lat. 54° 32' N., Long. 178° 31' E.                               | 45            | 850         | gn. m. fine. gy. s.         | Do.                   |
| 3785       | June 27      | Rat Ids., Aleutian Chain, S. 150 m.                              | 45            | 270         | gy. s. brk. sh.             | Do.                   |
| 3786       | June 27      | Lat. 54° 47' 20" N., Long. W. 178° 54' 00".                      | 46            | 2106        | gy. s. yl. m.               | Do.                   |



## HYDROGRAPHIC RECORDS.

*Record of hydrographic soundings of the Albatross during the years 1883-1900.*

| Serial No.                    | Date.    | Position. |          | Depth. | Character of bottom.        |
|-------------------------------|----------|-----------|----------|--------|-----------------------------|
|                               |          | Lat. N.   | Long. W. |        |                             |
| Cape Hatteras to Cape May.    |          |           |          |        |                             |
|                               | 1883.    | ° ' "     | ° ' "    | Fms.   |                             |
| 1                             | May 19   | 37 11 20  | 75 15 25 | 15     | gy. s.                      |
| 2                             | May 19   | 37 15 15  | 75 03 30 | 18     | gy. s.                      |
| 3                             | May 19   | 37 18 21  | 74 53 54 | 23     | gy. s.                      |
| 4                             | May 19   | 37 21 27  | 74 44 18 | 26     | gy. s. bk. sp.              |
| 5                             | May 19   | 37 24 33  | 74 34 42 | 34     | gy. s. bk. sp.              |
| 6                             | May 19   | 37 27 39  | 74 25 06 | 55     | lost lead.                  |
| 7                             | May 19   | 37 30 45  | 74 15 30 | 312    | br. m. f. s.                |
| 8                             | May 20   | 37 24 30  | 74 23 30 | 358    | br. m. f. s.                |
| 9                             | May 20   | 37 29 15  | 74 27 00 | 48     | wh. s. bk. sp.              |
| 10                            | May 20   | 37 34 45  | 74 28 00 | 44     | gy. s. bk. sp.              |
| 11                            | May 20   | 37 35 40  | 74 27 00 | 38     | gy. s. bk. sp.              |
| 12                            | May 20   | 37 44 25  | 74 25 30 | 37     | gy. s. gr.                  |
| 13                            | May 20   | 37 48 00  | 74 24 15 | 37     | gy. s. bk. sp.              |
| 14                            | May 20   | 37 49 48  | 74 19 46 | 39     | gy. s. bk.                  |
| 15                            | May 20   | 37 51 36  | 74 15 17 | 48     | s. gr. bk. sp.              |
| 16                            | May 20   | 37 53 24  | 74 10 45 | 56     | gy. s. g.                   |
| 17                            | May 20   | 37 55 12  | 74 06 19 | 68     | bk. s.                      |
| 18                            | May 20   | 37 57 00  | 74 01 50 | 74     | gy. s. bk. sp.              |
| 19                            | May 20   | 37 58 05  | 73 58 20 | 85     | gy. s. bk. sp.              |
| 20                            | May 21   | 37 53 20  | 74 03 10 | 172    | gy. m. fne. s.              |
| 21                            | May 21   | 37 48 33  | 74 08 00 | 96     | gy. s.                      |
| 22                            | May 21   | 37 43 47  | 74 12 50 | 86     | gy. s.                      |
| 23                            | May 21   | 37 39 00  | 74 17 40 | 68     | gy. s. bk. sp.              |
| 24                            | May 21   | 37 32 42  | 74 17 00 | 158    | gy. s.                      |
| 25                            | May 21   | 37 40 30  | 74 03 00 | 218    | bu. m. fne. s.              |
| Cape May to Nantucket.        |          |           |          |        |                             |
| 26                            | May 25   | 40 05 55  | 70 28 00 | 59     | no specimen.                |
| 27                            | May 26   | 39 27 25  | 72 06 40 | 802    | bu. m. fne. s.              |
| 28                            | May 26   | 39 29 30  | 72 09 40 | 459    | bu. m.                      |
| 29                            | May 26   | 39 31 00  | 72 12 00 | 364    | bu. m.                      |
| 30                            | May 26   | 39 32 00  | 72 19 10 | 182    | gn. m.                      |
| 31                            | May 26   | 39 32 54  | 72 17 30 | 328    | bu. m.                      |
| 32                            | July 28  | 37 54 49  | 68 05 25 | 2,976  | glob. oz.                   |
| 33                            | July 31  | 39 55 00  | 68 31 00 | 1,385  | glob. oz.                   |
| 34                            | July 31  | 40 02 20  | 68 50 30 | 369    | crs. s.                     |
| 35                            | Sept. 20 | 40 02 30  | 70 37 00 | 90     | gn. m.                      |
| Cape Hatteras to West Indies. |          |           |          |        |                             |
|                               | 1884.    |           |          |        |                             |
| a 36                          | Jan. 11  | 33 50 20  | 71 42 00 | 2,953  | lt. choc. oz.               |
| b 37                          | Jan. 13  | 31 15 42  | 67 39 10 | 2,787  | lt. choc. oz. glob.         |
| 38                            | Jan. 14  | 28 17 07  | 66 17 37 | 2,957  | lt. choc. oz. glob.         |
| c 39                          | Jan. 15  | 24 35 14  | 65 13 07 | 3,006  | stf. choc. c.               |
| Caribbean Sea.                |          |           |          |        |                             |
| 40                            | Jan. 17  | 19 15 00  | 65 07 00 | 3,468  | glob. oz.                   |
| d 41                          | Jan. 17  | 18 59 00  | 65 07 00 | 1,902  |                             |
| e 42                          | Jan. 24  | 18 09 00  | 64 58 50 | 516    | co. r.                      |
| 43                            | Jan. 24  | 18 04 30  | 65 01 10 | 1,146  | co. s. for.                 |
| 44                            | Jan. 24  | 18 00 00  | 65 04 00 | 1,975  |                             |
| 45                            | Jan. 24  | 17 55 30  | 65 06 00 | 2,501  | co. s. for.                 |
| 46                            | Jan. 24  | 17 51 00  | 65 08 05 | 2,423  | fne. co. s. for.            |
| 47                            | Jan. 25  | 17 46 30  | 65 10 25 | 1,482  | crs. co. s. brk. sh. for.   |
| 48                            | Jan. 25  | 17 42 00  | 65 12 40 | 978    | co. oz. for.                |
| 49                            | Jan. 25  | 17 37 30  | 65 15 00 | 928    | oz. for.                    |
| 50                            | Jan. 25  | 17 33 00  | 65 17 20 | 949    | co. s. for.                 |
| 51                            | Jan. 25  | 17 28 30  | 65 19 40 | 1,265  | co. oz. lge. pter. sh. for. |
| 52                            | Jan. 25  | 17 24 00  | 65 22 00 | 1,895  | co. s. for.                 |
| 53                            | Jan. 25  | 17 29 10  | 65 23 30 | 1,356  | oz. for.                    |
| 54                            | Jan. 25  | 17 34 20  | 65 25 00 | 990    | co. s. for.                 |
| 55                            | Jan. 25  | 17 39 30  | 65 26 30 | 933    | pter. co. s. for.           |
| 56                            | Jan. 25  | 17 44 15  | 65 27 50 | 1,243  | pter. co. oz. for.          |
| 57                            | Jan. 25  | 17 49 06  | 65 29 00 | 2,188  | oz. for.                    |
| 58                            | Jan. 25  | 17 45 20  | 65 35 35 | 1,345  | oz. for.                    |
| 59                            | Jan. 25  | 17 42 10  | 65 39 40 | 789    | oz. for.                    |
| 60                            | Jan. 25  | 17 39 00  | 65 44 00 | 578    | co. s. for.                 |
| 61                            | Jan. 25  | 17 35 50  | 65 48 10 | 1,303  | fne. co. s. for.            |
| 62                            | Jan. 25  | 17 32 40  | 65 52 20 | 2,017  | pter. co. s. for.           |
| 63                            | Jan. 26  | 17 15 30  | 65 36 20 | 2,690  | co. s. sh.                  |
| 64                            | Jan. 26  | 16 52 00  | 65 19 20 | 2,543  | fne. co. s. sh.             |
| 65                            | Jan. 26  | 16 42 02  | 65 02 20 | 2,312  | fne. co. s. sh. for.        |
| 66                            | Jan. 26  | 16 28 00  | 64 42 30 | 2,192  | co. s. for.                 |
| 67                            | Jan. 26  | 16 13 45  | 64 22 30 | 2,069  | co. s. for. sh.             |

a Near Ashton Shoal.

b Near Perseveranza Shoal.

c Near Mourand Shoal.

d Parted wire at 10 fathoms. Light westerly current.

e St. Thomas light NNE.  $\frac{1}{2}$  E. (mag.). Sail rock NW.  $\frac{1}{2}$  N. (mag.). Slight SW. set.



THE ALBATROSS, WITH SOUNDING APPARATUS READY FOR USE.



*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.     | Date.   | Position. |          | Depth. | Character of bottom. |
|----------------|---------|-----------|----------|--------|----------------------|
|                |         | Lat. N.   | Long. W. |        |                      |
| Caribbean Sea. |         |           |          |        |                      |
|                | 1884.   | ° ' "     | ° ' "    | Fms.   |                      |
| 68             | Jan. 27 | 16 04 15  | 64 07 00 | 1,920  | yl. oz. for.         |
| 69             | Jan. 27 | 15 54 46  | 63 52 00 | 1,060  | co. s. for.          |
| 70             | Jan. 27 | 15 48 00  | 63 45 20 | 1,091  | co. s. for.          |
| 71             | Jan. 27 | 15 44 10  | 63 42 10 | 950    | brk. co. sh.         |
| a 72           | Jan. 27 | 15 41 00  | 63 42 00 | 808    | fne. co. s. sh.      |
| b 73           | Jan. 27 | 15 40 18  | 63 38 36 | 355    | co. brk. sh.         |
| 74             | Jan. 27 | 15 38 32  | 63 37 36 | 15     | co.                  |
| 75             | Jan. 27 | 15 33 55  | 63 35 38 | 172    | fne. co. s.          |
| 76             | Jan. 27 | 15 29 18  | 63 33 40 | 367    | fne. co. s.          |
| 77             | Jan. 27 | 15 08 20  | 63 26 00 | 776    | co. s. for.          |
| 78             | Jan. 27 | 14 44 25  | 63 18 00 | 871    | fne. co. s. sh.      |
| 79             | Jan. 27 | 14 20 30  | 63 10 00 | 821    | co. s. sh. for.      |
| -80            | Jan. 28 | 13 56 35  | 63 02 00 | 684    | gy. m. for.          |
| 81             | Jan. 28 | 13 34 35  | 62 51 20 | 815    | m. for.              |
| 82             | Jan. 28 | 13 29 00  | 62 42 40 | 1,051  | for. m. bk. sp.      |
| 83             | Jan. 28 | 13 23 00  | 62 34 15 | 1,686  | for. m. bk. sp.      |
| 84             | Jan. 28 | 13 15 00  | 62 39 00 | 1,640  | for. m. bk. sp.      |
| 85             | Jan. 28 | 13 07 10  | 62 43 40 | 1,634  | for. m. bk. sp.      |
| 86             | Jan. 28 | 12 58 40  | 62 48 00 | 1,635  | bu. m. for. bk. sp.  |
| 87             | Jan. 29 | 12 50 40  | 62 53 00 | 1,642  | m. bk. sp. for.      |
| 88             | Jan. 29 | 12 29 00  | 62 38 30 | 1,630  | m. bk. sp. for.      |
| 89             | Jan. 29 | 12 07 30  | 62 24 00 | 1,552  | bu. m. for.          |
| 90             | Jan. 29 | 12 03 00  | 62 22 20 | 1,437  | bu. m.               |
| 91             | Jan. 29 | 11 58 00  | 62 20 50 | 1,121  | gy. bu. m.           |
| 92             | Jan. 29 | 11 53 19  | 62 19 10 | 1,247  | gy. m.               |
| 93             | Jan. 29 | 11 42 40  | 62 17 00 | 828    | hrd.                 |
| 94             | Jan. 29 | 11 34 20  | 62 15 40 | 441    | gy. m. fne. s.       |
| 95             | Jan. 29 | 11 27 00  | 62 13 00 | 280    | bk. m.               |
| 96             | Jan. 29 | 11 19 40  | 62 10 00 | 70½    | crs. g. brk. sh.     |
| 97             | Jan. 30 | 11 12 20  | 62 07 10 | 63     | dk. m. crs. s.       |
| 98             | Jan. 30 | 11 05 00  | 62 04 30 | 83     | bu. m.               |
| c 99           | Jan. 30 | 10 44 45  | 61 48 18 | 150    | m. s.                |
| d 100          | Jan. 30 | 10 43 45  | 61 48 50 | 141    | bu. m.               |
| 101            | Feb. 3  | 10 54 00  | 61 58 40 | 61     | sft. bu. m.          |
| 102            | Feb. 3  | 11 02 30  | 62 06 00 | 57     | sft. bu. m.          |
| 103            | Feb. 3  | 11 19 00  | 62 22 00 | 46     | brk. sh.             |
| 104            | Feb. 3  | 11 34 20  | 62 38 15 | 178    | bu. m.               |
| 105            | Feb. 3  | 11 45 30  | 63 01 00 | 387    | bu. m.               |
| 106            | Feb. 2  | 11 59 00  | 63 27 40 | 919    | rky.                 |
| 107            | Feb. 4  | 12 09 00  | 63 57 20 | 1,256  | gy. m. fne. s.       |
| 108            | Feb. 4  | 12 17 30  | 64 14 30 | 2,020  |                      |
| 109            | Feb. 4  | 12 22 50  | 64 38 00 | 2,371  | gy. oz.              |
| 110            | Feb. 4  | 12 41 00  | 64 23 00 | 1,828  | br. gy. m.           |
| 111            | Feb. 4  | 12 59 20  | 64 08 00 | 1,714  | gy. m.               |
| 112            | Feb. 4  | 13 15 30  | 63 52 10 | 1,463  | br. oz. for.         |
| 113            | Feb. 5  | 13 32 00  | 63 36 30 | 680    | gy. oz. for.         |
| 114            | Feb. 5  | 13 48 50  | 63 20 00 | 652    | br. oz. bk. sp.      |
| 115            | Feb. 5  | 14 07 10  | 63 37 55 | 852    | yl. m. fne. s.       |
| 116            | Feb. 5  | 14 21 44  | 63 58 45 | 1,615  | gy. m. for.          |
| 117            | Feb. 5  | 14 35 10  | 64 21 10 | 1,843  | gy. m. for.          |
| 118            | Feb. 5  | 14 51 00  | 64 42 00 | 2,115  | for. oz.             |
| 119            | Feb. 6  | 15 26 00  | 65 19 20 | 2,461  | lt. gy. m. for.      |
| 120            | Feb. 6  | 16 01 00  | 65 56 20 | 2,492  | gy. m. for.          |
| 121            | Feb. 6  | 16 36 20  | 66 41 00 | 2,501  | choc. glob. oz.      |
| 122            | Feb. 7  | 16 35 20  | 68 00 30 | 2,458  | choc. oz. for.       |
| 123            | Feb. 7  | 15 49 00  | 67 36 40 | 2,616  | choc. oz. for.       |
| 124            | Feb. 7  | 15 02 00  | 67 13 30 | 2,747  | choc. oz. for.       |
| 125            | Feb. 8  | 14 20 30  | 66 54 00 | 2,804  | choc. m. co.         |
| 126            | Feb. 8  | 13 40 00  | 66 35 00 | 2,814  | br. m. co.           |
| 127            | Feb. 8  | 13 25 04  | 66 25 00 | 2,844  | br. m. co.           |
| 128            | Feb. 8  | 12 54 40  | 66 11 10 | 2,768  | dk. choc. oz.        |
| 129            | Feb. 8  | 12 35 20  | 66 14 00 | 2,820  | dk. clayey oz        |
| 130            | Feb. 9  | 12 10 30  | 66 11 00 | 2,707  | dk. clayey oz        |
| e 131          | Feb. 9  | 12 04 00  | 66 16 40 | 1,806  | choc. oz. for.       |
| f 132          | Feb. 9  | 11 49 00  | 66 16 50 | 774    | gy. s. brk. sh.      |
| 133            | Feb. 9  | 11 33 20  | 66 19 00 | 533    | gy. m. for.          |
| 134            | Feb. 9  | 11 18 50  | 66 24 20 | 656    |                      |
| 135            | Feb. 9  | 11 05 00  | 66 30 00 | 239    | gn. m. s.            |
| 136            | Feb. 9  | 10 51 00  | 66 35 00 | 150    | bu. m. fne. s.       |
| g 137          | Feb. 9  | 10 42 30  | 66 48 20 | 135    | gn. m. fne. s.       |
| 138            | Feb. 9  | 10 51 30  | 67 01 40 | 164    | gy. s. brk. sh       |
| 139            | Feb. 9  | 11 01 00  | 67 14 15 | 605    | gy. m.               |
| 140            | Feb. 9  | 11 09 40  | 67 27 00 | 947    | gy. m.               |

a House on Aves Islet E. (mag.) 4½ m.

b House on Aves Islet NE. by E. (mag.) 1.3 m.

c S. end Chacachacare Island SSE. ½ E. (mag.). Cariaquita Point SW. ½ W. (mag.).

d E. end Goose Island SSW. (mag.). E. end Islette WNW. (mag.).

e El Roque light on horizon from a height of 25 feet. Bearing WNW. ½ W. (mag.).

f Astronomical position; Orchilla Island distant 6 miles; principal peak E. ½ N. (mag.).

g Line of bearing of sun, and bearing and distance of Punta Anare.

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.     | Date.   | Position. |          | Depth. | Character of bottom.       |
|----------------|---------|-----------|----------|--------|----------------------------|
|                |         | Lat. N.   | Long. W. |        |                            |
| Caribbean Sea. |         |           |          |        |                            |
|                | 1884.   | ° ' "     | ° ' "    | Fms.   |                            |
| 141            | Feb. 10 | 11 19 50  | 67 40 00 | 1,040  | lt. choc. m.               |
| 142            | Feb. 10 | 11 28 10  | 67 53 00 | 1,021  | gy. m.                     |
| 143            | Feb. 10 | 11 37 30  | 68 06 30 | 1,030  | lt. gy. c.                 |
| 144            | Feb. 10 | 11 46 40  | 68 19 50 | 980    | gy. m.                     |
| 145            | Feb. 10 | 11 52 00  | 68 35 40 | 630    | wh. s. r.                  |
| a 146          | Feb. 10 | 11 55 20  | 68 46 00 | 641    | yl. m. fine. s.            |
| 147            | Feb. 10 | 11 59 00  | 68 49 00 | 507    | gy. m.                     |
| b 148          | Feb. 10 | 12 05 52  | 68 55 00 | 74     | crs. s.                    |
| 149            | Feb. 18 | 12 01 20  | 68 55 30 | 410    | yl. m. s.                  |
| 150            | Feb. 18 | 11 56 00  | 68 56 00 | 733    | yl. m. s.                  |
| 151            | Feb. 18 | 11 50 45  | 68 56 30 | 738    | yl. m. s.                  |
| 152            | Feb. 18 | 11 40 25  | 68 57 30 | 321    | lt. gn. m. grit.           |
| 153            | Feb. 18 | 11 35 10  | 68 58 00 | 138    | gn. m.                     |
| c 154          | Feb. 18 | 11 30 00  | 68 58 30 | 45     | lt. br. m.                 |
| 155            | Feb. 18 | 11 51 00  | 69 18 00 | 458    | bu. m. fine. s.            |
| 156            | Feb. 18 | 11 58 30  | 69 26 20 | 455    | lt. gn. m. grit.           |
| 157            | Feb. 18 | 12 06 00  | 69 34 40 | 305    | gn. m. crs. s.             |
| 158            | Feb. 18 | 12 13 30  | 69 43 00 | 299    | gn. m. grit.               |
| d 159          | Feb. 19 | 12 23 30  | 69 48 00 | 420    | gy. m.                     |
| 160            | Feb. 19 | 12 32 50  | 69 50 00 | 634    | gy. m.                     |
| 161            | Feb. 19 | 12 54 30  | 69 55 00 | 797    | yl. m. crs. s. for.        |
| 162            | Feb. 19 | 13 40 20  | 70 10 45 | 2,694  | dk. br. m.                 |
| 163            | Feb. 19 | 14 24 00  | 70 28 20 | 2,360  | lt. br. m. s.              |
| 164            | Feb. 20 | 15 09 20  | 70 46 50 | 2,338  | lt. br. m. crs. s. for.    |
| 165            | Feb. 20 | 15 55 00  | 71 03 00 | 2,209  | lt. br. m. for.            |
| 166            | Feb. 20 | 16 42 00  | 71 18 00 | 2,028  | lt. br. m. for.            |
| 167            | Feb. 21 | 17 17 30  | 71 35 00 | 522    | lt. br. m. for.            |
| 168            | Feb. 21 | 17 26 00  | 71 44 45 | 302    | wh. co. s. brk. sh.        |
| 169            | Feb. 21 | 17 36 30  | 72 00 00 | 2,410  | wh. s. brk. sh.            |
| 170            | Feb. 21 | 17 48 00  | 72 12 20 | 2,434  |                            |
| 171            | Feb. 21 | 18 01 30  | 72 23 00 | 1,929  | gy. m. bk. s. brk. co. sh. |
| 172            | Feb. 21 | 18 07 00  | 72 29 00 | 1,538  | brk. co. s.                |
| e 173          | Feb. 21 | 18 10 30  | 72 32 30 | 253    | bu. m.                     |
| 174            | Feb. 21 | 18 01 00  | 72 34 00 | 1,903  | gy. m. bk. s. brk. co. sh. |
| 175            | Feb. 21 | 17 44 00  | 72 35 00 | 1,594  | lt. br. m. for.            |
| 176            | Feb. 22 | 17 28 00  | 72 36 30 | 1,946  | yl. m. s. for.             |
| 177            | Feb. 22 | 17 12 45  | 72 38 00 | 2,391  | br. m. for.                |
| 178            | Feb. 22 | 17 24 45  | 72 47 00 | 2,393  | br. oz. for.               |
| 179            | Feb. 22 | 17 36 30  | 72 56 00 | 2,423  | br. m. for.                |
| 180            | Feb. 22 | 17 45 30  | 73 04 00 | 2,391  | br. oz. for.               |
| 181            | Feb. 22 | 17 39 30  | 73 22 15 | 2,490  | br. oz. for.               |
| 182            | Feb. 22 | 17 48 00  | 73 34 15 | 2,369  | br. oz. for.               |
| 183            | Feb. 22 | 17 54 00  | 73 48 15 | 1,039  | gy. m. fine. s. for.       |
| 184            | Feb. 23 | 17 53 30  | 73 59 30 | 1,970  | gy. m. s. for.             |
| 185            | Feb. 23 | 17 53 15  | 74 11 00 | 1,672  | gy. m. fine. s. for.       |
| 186            | Feb. 23 | 17 53 00  | 74 22 30 | 1,206  | gy. m. fine. s. for.       |
| 187            | Feb. 23 | 18 01 00  | 74 31 45 | 894    | s. m. sh. for.             |
| 188            | Feb. 23 | 17 51 40  | 74 36 30 | 894    | yl. m. sh. for.            |
| 189            | Feb. 23 | 17 42 30  | 74 40 00 | 803    | br. m. for.                |
| 190            | Feb. 23 | 17 33 30  | 74 45 00 | 955    | yl. m. s. bk. sp.          |
| 191            | Feb. 23 | 17 23 15  | 74 51 30 | 1,146  | gy. m. s. for.             |
| 192            | Feb. 23 | 17 13 15  | 74 57 45 | 1,122  | gy. m. s. for.             |
| 193            | Feb. 23 | 17 26 30  | 75 06 45 | 968    | yl. m. fine. s.            |
| 194            | Feb. 24 | 18 02 00  | 74 57 30 | 1,510  | yl. m.                     |
| 195            | Feb. 24 | 18 18 30  | 74 53 30 | 262    | hrd.                       |
| 196            | Feb. 24 | 18 34 00  | 74 50 00 | 1,040  | gy. s.                     |
| 197            | Feb. 24 | 18 45 00  | 74 32 40 | 1,347  | yl. m.                     |
| 198            | Feb. 24 | 18 50 00  | 74 12 00 | 1,537  | yl. m.                     |
| 199            | Feb. 24 | 18 56 00  | 73 51 00 | 1,974  | dk. m.                     |
| 200            | Feb. 24 | 18 59 40  | 73 30 00 | 342    | hrd.                       |
| 201            | Feb. 24 | 19 19 40  | 73 27 00 | 800    | yl. m. sh. for.            |
| 202            | Feb. 25 | 19 16 30  | 73 47 30 | 502    | yl. m. s. sh. for.         |
| 203            | Feb. 25 | 19 24 30  | 74 05 15 | 700    | yl. m.                     |
| 204            | Feb. 25 | 19 32 30  | 74 23 00 | 1,908  | yl. m. brk. sh. for.       |
| 205            | Feb. 25 | 19 40 00  | 74 42 00 | 1,923  | gy. m. ine. s. for.        |
| f 206          | Feb. 25 | 19 43 21  | 75 15 30 | 1,745  | gy. m. s.                  |
| g 207          | Feb. 25 | 19 44 45  | 75 24 15 | 1,380  | gy. m. s. sh.              |
| g 208          | Feb. 25 | 19 46 10  | 75 33 00 | 1,380  | dk. m. bk. s. sh.          |
| g 209          | Feb. 26 | 19 47 30  | 75 41 30 | 1,425  | br. m. s. sh.              |
| h 210          | Feb. 26 | 19 49 00  | 75 50 30 | 1,175  | br. m. s. sh.              |

a Positions checked by bearing and distance of Little Curaçao light plotted in latitude 11° 58', longitude 68° 39'.

b Fort Rif light north (mag.) 1,800 feet.

c Astronomical position; Zamuro Point SE. (mag.); 1-knot W. by S. current.

d Light on east end Oruba Island W.  $\frac{1}{2}$  S. (mag.) 8 miles.

e Jacmel NW.  $\frac{1}{2}$  N. (mag.); Jacmel Point W. by S. (mag.).

f E. point Guantanamo Port N. by W. (mag.). Barracas Point WNW.  $\frac{1}{2}$  W. (mag.). Latitude by  $\times$  Rigel. No current.

g  $\frac{1}{2}$  to  $\frac{1}{2}$  knot E. set.

h Santiago light N. by W.  $\frac{1}{2}$  W. (mag.) 8  $\frac{1}{2}$  m. No current.

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.     | Date.   | Position. |          | Depth. | Character of bottom.     |
|----------------|---------|-----------|----------|--------|--------------------------|
|                |         | Lat. N.   | Long. W. |        |                          |
| Caribbean Sea. |         |           |          |        |                          |
| 1884.          |         |           |          |        |                          |
|                |         | ° ' "     | ° ' "    | Fms.   |                          |
| a 211          | Feb. 27 | 19 56 33  | 75 50 40 | 211    | gy. m. fine. s. brk. co. |
| 212            | Feb. 27 | 19 40 00  | 75 39 00 | 2,265  | gy. m.                   |
| 213            | Feb. 28 | 19 23 00  | 75 30 00 | 2,275  | br. m.                   |
| 214            | Feb. 28 | 19 06 00  | 75 21 30 | 1,768  | yl. m. brk. sh. for.     |
| 215            | Feb. 28 | 18 54 30  | 75 16 30 | 1,486  | yl. m. brk. sh. for.     |
| 216            | Feb. 28 | 18 32 30  | 75 06 00 | 870    | wh. s. brk. co. sh.      |
| 217            | Feb. 28 | 18 34 00  | 75 21 00 | 1,015  | lt. m. sh. for.          |
| 218            | Feb. 28 | 18 32 40  | 75 36 00 | 620    | yl. m.                   |
| 219            | Feb. 28 | 18 22 20  | 75 41 20 | 646    | brk. sh.                 |
| 220            | Feb. 28 | 18 12 00  | 75 46 40 | 1,153  | brk. sh. bk. s.          |
| 221            | Feb. 28 | 18 01 30  | 75 52 00 | 960    | gy. m.                   |
| b 222          | Feb. 29 | 17 51 00  | 76 00 30 | 450    | gy. m. s.                |
| 223            | Feb. 29 | 17 49 00  | 75 54 40 | 762    | yl. m.                   |
| 224            | Feb. 29 | 17 47 40  | 75 50 00 | 768    | yl. m. s.                |
| 225            | Feb. 29 | 17 46 50  | 75 47 20 | 830    | yl. m.                   |
| 226            | Feb. 29 | 17 46 15  | 75 45 30 | 828    | yl. m.                   |
| 227            | Feb. 29 | 17 45 20  | 75 42 45 | 443    | co. s.                   |
| 228            | Feb. 29 | 17 44 40  | 75 40 50 | 335    | wh. s. brk. sh.          |
| 229            | Feb. 29 | 17 43 55  | 75 39 00 | 22     | co.                      |
| 230            | Feb. 29 | 17 43 37  | 75 38 05 | 86     | co. brk. sh.             |
| 231            | Feb. 29 | 17 43 20  | 75 37 10 | 98     | co.                      |
| 232            | Feb. 29 | 17 44 20  | 75 37 40 | 193    | co.                      |
| 233            | Feb. 29 | 17 45 20  | 75 38 15 | 448    | co. brk. sh.             |
| 234            | Feb. 29 | 17 46 30  | 75 38 50 | 540    | co.                      |
| 235            | Feb. 29 | 17 45 25  | 75 39 05 | 387    | wh. co. s. brk. sh       |
| 236            | Feb. 29 | 17 44 05  | 75 39 00 | 23     | co.                      |
| 237            | Feb. 29 | 17 44 05  | 75 39 05 | 22     | co.                      |
| 238            | Feb. 29 | 17 43 35  | 75 38 55 | 21     | wh. co.                  |
| 239            | Feb. 29 | 17 43 05  | 75 38 50 | 20     | co.                      |
| 240            | Feb. 29 | 17 42 35  | 75 38 45 | 32     | co.                      |
| 241            | Feb. 29 | 17 42 10  | 75 38 40 | 200    | co. brk. sh.             |
| 242            | Feb. 29 | 17 42 15  | 75 37 40 | 376    | co. brk. sh.             |
| 243            | Feb. 29 | 17 42 20  | 75 36 40 | 329    | co. brk. sh.             |
| 244            | Feb. 29 | 17 42 45  | 75 37 15 | 198    | co. brk. sh.             |
| 245            | Feb. 29 | 17 43 15  | 75 37 50 | 166    | co. brk. sh.             |
| 246            | Feb. 29 | 17 44 00  | 75 39 40 | 22     | brk. sh. co.             |
| 247            | Feb. 29 | 17 43 55  | 75 40 20 | 21     | brk. sh. co.             |
| 248            | Feb. 29 | 17 43 50  | 75 41 00 | 81     | brk. sh. co.             |
| 249            | Feb. 29 | 17 43 45  | 75 41 40 | 141    | brk. sh. co.             |
| 250            | Feb. 29 | 17 42 50  | 75 41 35 | 21     | co.                      |
| 251            | Feb. 29 | 17 42 35  | 75 42 05 | 23     | co.                      |
| 252            | Feb. 29 | 17 42 20  | 75 42 35 | 24     | co. sh.                  |
| 253            | Feb. 29 | 17 42 05  | 75 43 05 | 261    |                          |
| 254            | Feb. 29 | 17 41 25  | 75 43 05 | 90     | co.                      |
| 255            | Feb. 29 | 17 40 30  | 75 43 00 | 20     | co.                      |
| 256            | Feb. 29 | 17 41 15  | 75 42 10 | 19     | co.                      |
| 257            | Feb. 29 | 17 41 55  | 75 41 25 | 21     | co.                      |
| 258            | Feb. 29 | 17 42 15  | 75 41 00 | 20     | co.                      |
| 259            | Feb. 29 | 17 42 40  | 75 40 40 | 21     | co.                      |
| 260            | Feb. 29 | 17 42 50  | 75 39 20 | 21     | co.                      |
| 261            | Feb. 29 | 17 41 35  | 75 39 40 | 20     | co.                      |
| 262            | Feb. 29 | 17 40 20  | 75 40 00 | 17.5   | co.                      |
| 263            | Feb. 29 | 17 39 45  | 75 40 10 | 18.5   | co.                      |
| 264            | Feb. 29 | 17 39 10  | 75 40 20 | 20     | co.                      |
| 265            | Feb. 29 | 17 38 00  | 75 40 40 | 20     | co.                      |
| 266            | Feb. 29 | 17 36 50  | 75 41 00 | 51     | co.                      |
| 267            | Feb. 29 | 17 36 50  | 75 41 50 | 19     | co.                      |
| 268            | Feb. 29 | 17 36 55  | 75 42 40 | 18     | co.                      |
| 269            | Feb. 29 | 17 37 00  | 75 43 30 | 20     | co.                      |
| 270            | Feb. 29 | 17 37 00  | 75 44 20 | 19     | co.                      |
| 271            | Feb. 29 | 17 37 05  | 75 45 15 | 524    |                          |
| 272            | Feb. 29 | 17 36 30  | 75 44 45 | 18     | co.                      |
| 273            | Feb. 29 | 17 36 00  | 75 44 15 | 360    | co.                      |
| 274            | Feb. 29 | 17 36 00  | 75 45 10 | 250    | co.                      |
| 275            | Feb. 29 | 17 36 05  | 75 46 10 | 320    | co.                      |
| 276            | Feb. 29 | 17 36 30  | 75 48 00 | 838    | co.                      |
| 277            | Feb. 29 | 17 37 35  | 75 52 10 | 875    | yl. m. sh. for.          |
| 278            | Mar. 1  | 17 38 20  | 75 56 25 | 863    | yl. m. s. sh.            |
| 279            | Mar. 1  | 17 39 10  | 76 00 35 | 597    | yl. m. s. sh.            |
| c 280          | Mar. 1  | 17 40 10  | 76 04 50 | 760    | yl. m. s. sh.            |
| 281            | Mar. 1  | 17 41 20  | 76 09 40 | 414    | yl. m. s. sh.            |
| 282            | Mar. 1  | 17 42 30  | 76 14 30 | 490    | hrd.                     |
| 283            | Mar. 1  | 17 43 40  | 76 19 15 | 612    | co.                      |
| d 284          | Mar. 1  | 17 44 50  | 76 24 00 | 581    | br. m.                   |
| d 285          | Mar. 1  | 17 46 00  | 76 28 40 | 590    | yl. m.                   |
| d 286          | Mar. 1  | 17 47 00  | 76 33 10 | 542    | bu. m.                   |
| d 287          | Mar. 1  | 17 48 10  | 76 37 50 | 777    | gy. m. bk. s.            |
| d 288          | Mar. 1  | 17 49 30  | 76 43 35 | 484    | gy. m.                   |

a By bearing and mic. distance of Santiago de Cuba light, plotted in latitude  $19^{\circ} 57' 26''$ , longitude  $75^{\circ} 52' 13''$ . Light E. set.

b Bearing and dist. Morant light. NE. set.  
c Bearing and distance of Morant light.  
d Cross-bearings of objects on shore.



*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.     | Date.   | Position. |          | Depth. | Character of bottom. |
|----------------|---------|-----------|----------|--------|----------------------|
|                |         | Lat. N.   | Long. W. |        |                      |
| Caribbean Sea. |         |           |          |        |                      |
| 1884.          |         |           |          |        |                      |
|                |         | ° ' "     | ° ' "    | Fms.   |                      |
| a 289          | Mar. 1  | 17 51 20  | 76 44 30 | 400    | gy. m.               |
| a 290          | Mar. 11 | 17 53 05  | 76 43 00 | 440    | bk. m.               |
| a 291          | Mar. 11 | 17 52 20  | 76 46 05 | 18     | co.                  |
| a 292          | Mar. 11 | 17 48 45  | 76 46 05 | 355    | br. m. fne. s.       |
| a 293          | Mar. 11 | 17 46 10  | 76 46 05 | 26     | co.                  |
| a 294          | Mar. 11 | 17 41 10  | 76 46 05 | 790    | br. m. crs. s.       |
| 295            | Mar. 11 | 17 38 40  | 76 41 10 | 890    |                      |
| 296            | Mar. 12 | 17 37 10  | 76 36 40 | 980    | bk. m. s.            |
| 297            | Mar. 12 | 17 35 40  | 76 32 10 | 1,043  | gy. s.               |
| 298            | Mar. 12 | 17 34 10  | 76 27 40 | 1,084  | bu. m.               |
| 299            | Mar. 12 | 17 32 40  | 76 23 10 | 933    | co.                  |
| 300            | Mar. 12 | 17 29 40  | 76 14 10 | 822    | yl. m. sh. for.      |
| 301            | Mar. 12 | 17 28 00  | 76 09 10 | 808    | yl. m. s.            |
| 302            | Mar. 12 | 17 26 45  | 76 04 10 | 790    | hrd.                 |
| 303            | Mar. 12 | 17 25 40  | 76 01 10 | 620    | hrd.                 |
| 304            | Mar. 12 | 17 31 10  | 75 58 00 | 794    | yl. m.               |
| 305            | Mar. 12 | 17 32 30  | 75 53 00 | 723    | hrd.                 |
| 306            | Mar. 12 | 17 32 45  | 75 49 55 | 218    | co.                  |
| 307            | Mar. 12 | 17 32 50  | 75 48 20 | 490    | hrd.                 |
| 308            | Mar. 12 | 17 34 35  | 75 46 50 | 527    |                      |
| 309            | Mar. 12 | 17 34 35  | 75 44 45 | 505    | gy. s.               |
| 310            | Mar. 12 | 17 34 35  | 75 43 40 | 500    |                      |
| 311            | Mar. 12 | 17 34 35  | 75 39 35 | 515    | s.                   |
| 312            | Mar. 12 | 17 23 40  | 75 38 15 | 645    | hrd.                 |
| 313            | Mar. 13 | 17 12 00  | 75 36 30 | 915    | yl. m. s.            |
| 314            | Mar. 13 | 16 54 20  | 75 33 50 | 1,012  | yl. m. s. for.       |
| 315            | Mar. 13 | 16 31 00  | 75 30 10 | 1,250  | yl. m. s. for.       |
| 316            | Mar. 13 | 16 07 45  | 75 26 30 | 1,230  | yl. m. s. for.       |
| 317            | Mar. 13 | 15 43 00  | 75 24 30 | 1,662  | yl. m. s. for.       |
| 318            | Mar. 13 | 15 18 30  | 75 22 30 | 2,295  |                      |
| 319            | Mar. 14 | 14 42 30  | 75 18 30 | 2,315  | yl. m. s. for.       |
| 320            | Mar. 14 | 14 06 30  | 75 14 30 | 2,250  | dk. br. m. for.      |
| 321            | Mar. 14 | 13 30 00  | 74 57 00 | 2,175  | dk. br. m. s. for.   |
| 322            | Mar. 14 | 12 53 30  | 74 38 00 | 2,185  | bk. m. for.          |
| 323            | Mar. 15 | 12 17 00  | 74 19 00 | 2,095  | bk. m. s.            |
| 324            | Mar. 15 | 12 11 30  | 74 27 30 | 2,057  | bk. s.               |
| 325            | Mar. 15 | 11 46 00  | 74 27 30 | 1,250  | bk. m.               |
| 326            | Mar. 15 | 11 31 00  | 74 28 00 | 745    | bk. m.               |
| 327            | Mar. 15 | 11 21 00  | 74 28 00 | 578    | bu. m.               |
| 328            | Mar. 15 | 11 11 00  | 74 28 00 | 420    | bk. m. s.            |
| 329            | Mar. 15 | 11 22 00  | 74 41 30 | 440    | bk. s. bu. m.        |
| 330            | Mar. 16 | 11 33 30  | 74 57 00 | 920    | bk. s. bu. m.        |
| 331            | Mar. 16 | 11 18 30  | 74 58 20 | 615    | bk. s. bu. m.        |
| 332            | Mar. 16 | 11 13 00  | 75 05 00 | 457    | bk. m.               |
| 333            | Mar. 22 | 11 01 00  | 75 03 00 | 10     | bk. m.               |
| 334            | Mar. 22 | 11 01 15  | 75 08 40 | 39     | bu. c.               |
| 335            | Mar. 22 | 11 01 45  | 75 19 40 | 228    | bu. m.               |
| 336            | Mar. 22 | 11 05 00  | 75 32 00 | 625    | bu. m.               |
| 337            | Mar. 22 | 11 08 00  | 75 41 40 | 845    | br. m.               |
| 338            | Mar. 22 | 11 11 00  | 75 50 30 | 1,195  | br. m. gn. m.        |
| 339            | Mar. 22 | 10 56 00  | 75 49 50 | 980    | br. m. gn. m.        |
| 340            | Mar. 22 | 10 42 30  | 75 49 00 | 880    | br. m. gn. m.        |
| 341            | Mar. 22 | 10 30 30  | 75 48 30 | 825    | br. m.               |
| 342            | Mar. 23 | 10 26 15  | 76 03 00 | 1,165  | br. m.               |
| 343            | Mar. 23 | 10 22 10  | 76 17 30 | 1,270  | br. m.               |
| 344            | Mar. 23 | 10 18 00  | 76 32 00 | 1,580  | br. m.               |
| 345            | Mar. 23 | 10 01 30  | 76 24 45 | 750    | br. m.               |
| 346            | Mar. 23 | 9 46 00   | 76 18 30 | 255    | gn. m.               |
| 347            | Mar. 23 | 9 30 00   | 76 14 45 | 38     | gn. m. s.            |
| 348            | Mar. 23 | 9 32 00   | 76 34 45 | 466    | hrd.                 |
| 349            | Mar. 23 | 9 33 30   | 76 43 45 | 960    | br. m. gn. m.        |
| 350            | Mar. 24 | 9 36 20   | 77 02 45 | 1,616  | choc. oz. for        |
| 351            | Mar. 24 | 9 39 40   | 77 25 00 | 1,363  | br. m. for.          |
| 352            | Mar. 24 | 9 43 00   | 77 47 00 | 570    | br. m. for.          |
| 353            | Mar. 24 | 9 44 40   | 77 56 00 | 550    | lt. br. m.           |
| 354            | Mar. 24 | 9 47 00   | 78 09 30 | 630    | br. m. s.            |
| 355            | Mar. 24 | 9 48 00   | 78 24 00 | 1,017  | br. m. s.            |
| 356            | Mar. 24 | 9 47 00   | 78 39 00 | 962    | br. m.               |
| 357            | Mar. 24 | 9 45 30   | 78 54 00 | 950    | gy. m.               |
| 358            | Mar. 24 | 9 47 00   | 79 03 00 | 1,060  | sft. gy. m.          |
| 359            | Mar. 24 | 9 48 30   | 79 11 45 | 970    | gn. m. br. m.        |
| 360            | Mar. 25 | 9 51 15   | 79 20 30 | 828    | gn. m. gy. m. sh.    |
| 361            | Mar. 25 | 9 54 00   | 79 30 00 | 1,155  | br. m. gn. m.        |
| 362            | Mar. 25 | 9 47 00   | 79 32 30 | 580    | bu. m.               |
| 363            | Mar. 25 | 9 45 15   | 79 34 00 | 370    | bu. m.               |
| 364            | Mar. 25 | 9 43 15   | 79 35 30 | 58     | bu. m.               |
| 365            | Apr. 2  | 9 38 30   | 79 59 22 | 707    | stk. c.              |
| 366            | Apr. 2  | 9 47 45   | 80 02 50 | 611    | br. s.               |
| 367            | Apr. 2  | 9 57 00   | 80 06 20 | 1,153  | gy. m.               |
| 368            | Apr. 2  | 10 14 20  | 80 13 30 | 1,853  | br. m. for.          |

a Cross-bearings of objects on shore.

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.      | Date.   | Position. |          | Depth. | Character of bottom. |
|-----------------|---------|-----------|----------|--------|----------------------|
|                 |         | Lat. N.   | Long. W. |        |                      |
| Caribbean Sea.  |         |           |          |        |                      |
|                 | 1884.   | ° ' "     | ° ' "    | Fms.   |                      |
| 369             | Apr. 3  | 10 35 30  | 80 22 30 | 1,900  | br. m. for.          |
| 370             | Apr. 3  | 10 46 30  | 80 32 00 | 1,849  | br. m.               |
| 371             | Apr. 3  | 11 20 00  | 80 42 10 | 1,832  | br. m. for.          |
| 372             | Apr. 3  | 11 43 30  | 80 51 30 | 1,570  | br. m. for.          |
| 373             | Apr. 4  | 12 08 00  | 81 03 15 | 1,736  | br. m. for.          |
| 374             | Apr. 4  | 12 32 00  | 81 16 00 | 1,002  | br. m. for.          |
| 375             | Apr. 4  | 13 12 00  | 81 27 20 | 727    | yl. m.               |
| a 376           | Apr. 4  | 13 16 05  | 81 26 40 | 339    | co. s.               |
| a 377           | Apr. 9  | 13 26 10  | 81 25 10 | 601    | hrd.                 |
| 378             | Apr. 9  | 13 30 30  | 81 23 30 | 472    | fne. co. s.          |
| 379             | Apr. 9  | 13 41 20  | 81 15 30 | 262    | co. s. for.          |
| 380             | Ayr. 9  | 13 45 15  | 81 11 30 | 498    | yl. m. co.           |
| 381             | Apr. 9  | 13 53 15  | 81 03 45 | 625    | hrd.                 |
| 382             | Apr. 9  | 14 01 20  | 80 56 10 | 577    | co. and s.           |
| 383             | Apr. 9  | 14 09 20  | 80 50 10 | 596    | yl. m.               |
| 384             | Apr. 9  | 14 17 00  | 80 43 30 | 661    | hrd.                 |
| 385             | Apr. 9  | 14 25 45  | 80 37 45 | 889    | co.                  |
| 386             | Apr. 10 | 14 34 30  | 80 32 00 | 982    | yl. m. for.          |
| 387             | Apr. 10 | 14 43 20  | 80 26 00 | 1,066  | yl. m. for.          |
| 388             | Apr. 10 | 14 48 30  | 80 23 00 | 1,069  | yl. m. fne. co.      |
| 389             | Apr. 10 | 14 53 40  | 80 20 00 | 1,151  | yl. m. fne. co.      |
| 390             | Apr. 10 | 14 58 50  | 80 17 00 | 971    | yl. m. fne. co.      |
| 391             | Apr. 10 | 15 09 00  | 80 23 00 | 756    | yl. co. oz. for.     |
| 392             | Apr. 10 | 15 19 00  | 80 28 45 | 690    | yl. co. oz.          |
| 393             | Apr. 10 | 15 47 30  | 80 46 00 | 511    | br. m. for.          |
| 394             | Apr. 10 | 16 02 00  | 80 53 20 | 19     | co.                  |
| 395             | Apr. 10 | 16 15 00  | 81 01 00 | 19     | co.                  |
| 396             | Apr. 10 | 16 28 30  | 81 08 00 | 23     | co.                  |
| 397             | Apr. 11 | 16 41 30  | 81 21 40 | 136    | brk. co.             |
| 398             | Apr. 11 | 17 03 30  | 81 42 40 | 444    | gy. m. fne. co. for. |
| 399             | Apr. 11 | 17 25 00  | 82 05 40 | 920    | yl. oz. for.         |
| 400             | Apr. 11 | 17 42 00  | 82 34 00 | 3,169  | yl. oz. for.         |
| 401             | Apr. 11 | 18 01 30  | 82 54 10 | 2,695  | yl. oz. for.         |
| 402             | Apr. 11 | 18 18 45  | 83 01 10 | 2,299  | yl. oz. for.         |
| 403             | Apr. 12 | 18 24 20  | 83 15 15 | 3,008  | yl. oz. for.         |
| 404             | Apr. 12 | 18 30 00  | 83 16 30 | 2,829  | yl. oz. for.         |
| 405             | Apr. 12 | 18 43 00  | 83 36 45 | 735    | yl. oz. for. pter.   |
| 406             | Apr. 12 | 18 48 30  | 83 45 30 | 708    | yl. oz. for.         |
| 407             | Apr. 12 | 18 49 00  | 83 46 45 | 12     | co.                  |
| 408             | Apr. 12 | 18 52 00  | 83 52 45 | 14     | co.                  |
| 409             | Apr. 12 | 18 54 45  | 83 53 45 | 891    | yl. oz.              |
| 410             | Apr. 12 | 19 11 00  | 84 01 15 | 2,014  | yl. oz. for.         |
| 411             | Apr. 12 | 19 55 00  | 84 19 45 | 2,522  | yl. oz. for.         |
| 412             | Apr. 13 | 20 33 00  | 84 36 20 | 2,575  | yl. oz. for.         |
| Gulf of Mexico. |         |           |          |        |                      |
| 413             | Apr. 13 | 21 15 41  | 84 48 00 | 2,350  | yl. oz. for.         |
| 414             | Apr. 13 | 21 40 00  | 84 57 00 | 1,550  | yl. oz. for.         |
| b 415           | Apr. 13 | 21 44 40  | 84 58 45 | 950    | yl. oz. for.         |
| c 419           | Apr. 14 | 23 48 14  | 84 06 55 | 1,356  | yl. oz. for.         |
| d 420           | May 1   | 23 06 00  | 83 03 45 | 625    | co.                  |
| 421             | May 2   | 22 04 15  | 84 59 35 | 476    | yl. co. m.           |
| 422             | May 2   | 22 01 25  | 85 00 30 | 243    | co.                  |
| 423             | May 2   | 22 00 25  | 85 00 25 | 314    | co.                  |
| 424             | May 2   | 22 00 00  | 85 00 15 | 355    | co.                  |
| 425             | May 2   | 21 59 00  | 84 59 55 | 357    | co.                  |
| 426             | May 2   | 21 58 00  | 84 59 35 | 279    | co.                  |
| 427             | May 2   | 21 59 15  | 85 00 35 | 370    | fne. s.              |
| e 428           | May 2   | 22 00 42  | 85 02 00 | 15.5   | co.                  |
| 429             | May 2   | 22 01 10  | 85 02 20 | 19     | co.                  |
| 430             | May 2   | 22 01 30  | 85 02 40 | 114    | co.                  |
| 431             | May 2   | 22 01 20  | 85 03 30 | 256    | co.                  |
| 432             | May 2   | 22 00 20  | 85 03 25 | 250    | fne. co.             |
| 433             | May 2   | 22 00 25  | 85 03 05 | 207    | co.                  |
| 434             | May 2   | 22 00 30  | 85 02 50 | 128    | co.                  |
| 435             | May 2   | 22 00 35  | 85 02 30 | 16     | co.                  |
| 436             | May 2   | 22 00 10  | 85 02 15 | 252    | co. brk. sh.         |
| 437             | May 2   | 22 00 20  | 85 01 45 | 227    | co. brk. sh.         |
| 438             | May 2   | 22 00 48  | 85 01 30 | 15.5   | co.                  |
| 439             | May 2   | 22 01 16  | 85 01 15 | 14.5   | co.                  |
| 440             | May 2   | 22 01 44  | 85 01 00 | 16.5   | co.                  |
| 441             | May 2   | 22 02 12  | 85 01 45 | 24.5   | co. brk. sh.         |
| 442             | May 2   | 22 02 40  | 85 00 30 | 251    | co. br. r.           |
| 443             | May 2   | 22 02 45  | 85 01 50 | 424    | co.                  |
| 444             | May 2   | 22 02 10  | 85 02 05 | 270    | co. brk. sh.         |
| 445             | May 2   | 22 01 45  | 85 02 05 | 21     | co.                  |
| 446             | May 2   | 22 01 15  | 85 02 05 | 16.5   | co.                  |

a Cross bearings on Old Providence Island.

b Bearing of Cape San Antonio light, and altitude of \* Capella.

c Serial Nos. 416 to 418 missing.

d Astronomical observation; cross bearings on shore; 1½ knots W. set.

e Anchored boat and established position.

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.      | Date. | Position.                                  |          | Depth. | Character of bottom. |
|-----------------|-------|--|----------|--------|----------------------|
|                 |       | Lat. N.                                    | Long. W. |        |                      |
| Gulf of Mexico. |       |  |          |        |                      |
| 1884.           |       |  |          |        |                      |
| 447             | May 2 | 22 04 18                                   | 85 02 15 | 567    | co.                  |
| 448             | May 2 | 22 05 50                                   | 85 04 30 | 701    | yl. oz. for.         |
| 449             | May 2 | 22 07 20                                   | 85 06 45 | 913    | yl. oz. for.         |
| 450             | May 2 | 22 08 55                                   | 85 09 00 | 1,069  | yl. oz. for.         |
| 451             | May 2 | 22 10 50                                   | 85 12 00 | 1,186  | for. pter.           |
| 452             | May 2 | 22 09 40                                   | 85 18 40 | 1,238  | for. pter.           |
| 453             | May 2 | 22 06 30                                   | 85 15 00 | 1,149  | co.                  |
| 454             | May 2 | 22 03 50                                   | 85 11 55 | 871    | co.                  |
| 455             | May 2 | W. of Antonio Knoll.                       |          | 277    | co.                  |
| 456             | May 2 | W. of Antonio Knoll.                       |          | 490    | co.                  |
| 457             | May 3 | 21 57 10                                   | 85 04 30 | 450    | co.                  |
| 458             | May 3 | 21 55 45                                   | 85 02 50 | 576    | co.                  |
| 459             | May 3 | About 2.5 miles WNW. of San Antonio light. |          | 402    | co.                  |
| 460             | May 3 | 21 53 00                                   | 85 02 55 | 689    | co.                  |
| 461             | May 3 | 21 54 25                                   | 85 07 55 | 618    | co.                  |
| 462             | May 3 | 21 55 50                                   | 85 13 00 | 691    | co.                  |
| 463             | May 3 | 21 56 30                                   | 85 15 20 | 608    | co.                  |
| 464             | May 3 | 21 59 55                                   | 85 13 45 | 850    | co.                  |
| 465             | May 3 | 21 58 30                                   | 85 10 50 | 543    | co.                  |
| 466             | May 3 | 21 57 00                                   | 85 08 00 | 487    | co. brk. sh.         |
| 467             | May 3 | 21 55 30                                   | 85 05 15 | 593    | co. brk. sh.         |
| 468             | May 3 | 21 54 05                                   | 85 02 40 | 523    | co.                  |
| 469             | May 3 | 21 53 05                                   | 85 00 40 | 558    | co.                  |
| 470             | May 3 | 21 52 35                                   | 85 00 45 | 541    | co. oz.              |
| 471             | May 3 | 21 52 40                                   | 85 01 45 | 629    | co. oz.              |
| 472             | May 3 | 21 51 55                                   | 85 02 30 | 692    | co. oz.              |
| 473             | May 3 | 21 52 10                                   | 85 05 30 | 583    | co.                  |
| 474             | May 3 | 21 52 30                                   | 85 09 35 | 885    | co. oz.              |
| 475             | May 3 | 21 52 50                                   | 85 13 25 | 775    | hrd.                 |
| 476             | May 3 | 21 49 45                                   | 85 13 25 | 923    | rky.                 |
| 477             | May 3 | 21 50 10                                   | 85 08 45 | 887    | rky.                 |
| 478             | May 3 | 21 50 45                                   | 85 04 10 | 815    | rky.                 |
| 479             | May 3 | 21 51 20                                   | 84 59 30 | 263    | rky.                 |
| 480             | May 3 | 21 50 10                                   | 85 01 35 | 342    | co.                  |
| 481             | May 3 | 21 49 05                                   | 85 05 50 | 674    | co.                  |
| 482             | May 3 | 21 47 55                                   | 85 10 00 | 937    | co. s.               |
| 483             | May 3 | 21 46 25                                   | 85 15 20 | 1,023  | co. s.               |
| 484             | May 3 | 21 43 20                                   | 85 14 00 | 1,062  | fne. co.             |
| 485             | May 3 | 21 45 30                                   | 85 10 00 | 971    | co.                  |
| 486             | May 3 | 21 48 00                                   | 85 04 45 | 574    | hrd.                 |
| 487             | May 3 | 21 50 20                                   | 84 59 30 | 306    | hrd.                 |
| 488             | May 3 | 21 47 35                                   | 84 57 15 | 329    | hrd.                 |
| 489             | May 4 | 21 45 50                                   | 84 59 15 | 874    | co. br. m.           |
| 490             | May 4 | 21 48 00                                   | 84 57 30 | 288    | co.                  |
| 491             | May 4 | 21 50 10                                   | 84 58 45 | 232    | co.                  |
| 492             | May 4 | 21 50 45                                   | 84 59 00 | 255    | fne. co.             |
| 493             | May 4 | 21 53 05                                   | 84 59 30 | 415    | fne. co.             |
| 494             | May 4 | 21 54 00                                   | 85 00 40 | 537    | co.                  |
| 495             | May 4 | 21 55 00                                   | 85 01 50 | 516    | hrd.                 |
| 496             | May 4 | 21 54 45                                   | 84 58 40 | 274    | hrd.                 |
| 497             | May 4 | 21 55 55                                   | 85 00 15 | 475    | co.                  |
| 498             | May 4 | 21 57 10                                   | 85 01 50 | 474    | co. crs. g.          |
| 499             | May 4 | 21 58 25                                   | 85 03 40 | 461    | co.                  |
| 500             | May 4 | 21 59 40                                   | 85 05 15 | 283    | hrd.                 |
| 501             | May 4 | 22 01 05                                   | 85 07 10 | 703    | yl. m.               |
| 502             | May 4 | 22 00 35                                   | 85 08 25 | 732    | yl. oz. for.         |
| 503             | May 4 | 22 00 05                                   | 85 09 40 | 776    | hrd.                 |
| 504             | May 4 | 21 59 20                                   | 85 08 40 | 715    | yl. oz.              |
| 505             | May 4 | 21 59 10                                   | 85 06 55 | 554    | yl. oz.              |
| 506             | May 4 | 21 59 50                                   | 85 07 45 | 747    | yl. oz.              |
| 507             | May 4 | 21 58 30                                   | 85 06 10 | 423    | brk. sh.             |
| 508             | May 4 | 21 58 45                                   | 85 04 50 | 269    | hrd.                 |
| 509             | May 4 | 22 03 00                                   | 85 04 50 | 657    | yl. oz.              |
| 510             | May 4 | 22 02 20                                   | 85 03 00 | 526    | yl. oz.              |
| 511             | May 5 | 22 07 05                                   | 85 02 45 | 600    | co.                  |
| 512             | May 5 | 22 09 15                                   | 85 03 30 | 818    | hrd.                 |
| 513             | May 5 | 22 11 40                                   | 85 04 15 | 986    | yl. m. brk. co.      |
| 514             | May 5 | 22 12 15                                   | 85 00 45 | 953    | yl. m. fne. co.      |
| 515             | May 6 | 22 09 15                                   | 85 00 25 | 769    | yl. oz. for.         |
| 516             | May 6 | 22 06 30                                   | 85 00 00 | 499    | yl. m.               |
| b 517           | May 6 | 22 41 20                                   | 84 15 00 | 388    | yl. oz.              |
| 518             | May 6 | 22 45 20                                   | 84 15 00 | 817    | yl. oz.              |
| 519             | May 6 | 22 49 20                                   | 84 15 00 | 950    | fne. co. s.          |
| 520             | May 6 | 22 50 10                                   | 84 11 00 | 801    | yl. oz. s. for.      |

a Latitudes of positions on Antonio Knoll absolute; those of other soundings and the longitudes of all depend on Cape San Antonio light being in Lat. 21° 51' 30" N., Long. 84° 57' 38" W.

b N. end of Jutias Cay ENE. (mag.).

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                  | Date.    | Position. |          | Depth. | Character of bottom. |
|-----------------------------|----------|-----------|----------|--------|----------------------|
|                             |          | Lat. N.   | Long. W. |        |                      |
| Florida to Cape Hatteras.   |          |           |          |        |                      |
| 1884.                       |          |           |          |        |                      |
| 521                         | May 12   | 30 46 00  | 78 35 00 | 470    | g. brk. sh.          |
| 522                         | May 14   | 34 14 00  | 72 35 30 | 2,537  | br. oz.              |
| 523                         | May 14   | 34 48 45  | 72 25 00 | 2,462  | br. oz.              |
| Cape Hatteras to Nantucket. |          |           |          |        |                      |
| 524                         | July 20  | 37 57 20  | 73 56 10 | 86     | g.                   |
| 525                         | July 22  | 39 29 00  | 72 22 00 | 79     | gn. m. s.            |
| 526                         | July 22  | 39 30 00  | 72 18 00 | 104    | gn. m. s.            |
| 527                         | July 22  | 39 32 00  | 72 18 20 | 197    | stf. bu. c.          |
| 528                         | July 22  | 39 29 30  | 72 14 40 | 121    | gy. m. s.            |
| 529                         | July 22  | 39 28 00  | 72 16 00 | 94     | gn. m.               |
| 530                         | July 22  | 39 27 40  | 72 18 30 | 91     | bk. m. fne. s.       |
| 531                         | July 22  | 39 27 20  | 72 20 40 | 73     | bk. m. s.            |
| 532                         | July 22  | 39 31 50  | 72 05 00 | 143    | gy. S. bk. Sp.       |
| 533                         | July 23  | 39 23 45  | 71 43 00 | 992    | gn. m. r.            |
| 534                         | Aug. 2   | 40 00 00  | 70 38 00 | 172    | gy. m. fne. s.       |
| 535                         | Aug. 2   | 40 01 30  | 70 38 00 | 139    | gy. m. fne. s.       |
| 536                         | Aug. 2   | 40 03 00  | 70 38 00 | 101    | gn. m. fne. s.       |
| 537                         | Aug. 2   | 39 58 45  | 70 55 30 | 168    | gn. m. s.            |
| 538                         | Aug. 3   | 40 04 30  | 71 20 00 | 57     | gy. s.               |
| 539                         | Aug. 3   | 40 02 00  | 71 13 45 | 100    | gn. m. s. sp.        |
| 540                         | Aug. 3   | 40 01 30  | 71 12 30 | 113    | gn. m. s. bk. sp.    |
| 541                         | Aug. 3   | 39 56 30  | 71 10 00 | 194    | gn. m. s.            |
| 542                         | Aug. 3   | 39 56 30  | 71 08 00 | 192    | gn. m. s.            |
| 543                         | Aug. 3   | 39 54 00  | 71 04 00 | 265    | gn. m. s.            |
| 544                         | Aug. 3   | 39 55 00  | 71 07 00 | 221    | gn. m. s.            |
| 545                         | Aug. 4   | 39 47 00  | 70 16 30 | 784    | gn. m. s.            |
| 546                         | Aug. 5   | 39 54 30  | 70 15 40 | 762    | gn. m.               |
| 547                         | Aug. 5   | 39 50 30  | 70 15 40 | 769    | gn. m. s.            |
| 548                         | Aug. 19  | 39 48 30  | 71 41 15 | 111    | gn. m. s.            |
| 549                         | Aug. 20  | 39 34 00  | 71 34 30 | 925    | gy. oz.              |
| 550                         | Aug. 22  | 40 00 00  | 70 28 30 | 243    | gn. m.               |
| 551                         | Aug. 22  | 39 53 00  | 70 31 45 | 356    | gn. m.               |
| 552                         | Aug. 23  | 39 40 05  | 69 23 00 | 1,094  | bu. oz.              |
| 553                         | Sept. 7  | 37 41 00  | 69 16 15 | 2,704  | gy. oz.              |
| 554                         | Sept. 11 | 37 22 53  | 73 06 30 | 1,600  | gy. glob. oz.        |
| 555                         | Sept. 12 | 38 38 20  | 73 10 00 | 190    | gn. m. fne. s.       |
| 556                         | Sept. 12 | 38 40 00  | 73 03 00 | 474    | gn. m.               |
| 557                         | Sept. 13 | 39 08 30  | 72 12 30 | 851    | gn. m.               |
| 558                         | Sept. 26 | 40 37 00  | 70 32 00 | 37     | gn. m.               |
| 559                         | Oct. 18  | 37 07 30  | 74 37 00 | 54     | s. g.                |
| 560                         | Oct. 21  | 35 22 00  | 74 54 30 | 43     | gy. bk. s.           |
| 561                         | Oct. 21  | 35 21 30  | 74 48 30 | 1,007  | yy. m.               |
| Cape Hatteras to Savannah.  |          |           |          |        |                      |
| 1885.                       |          |           |          |        |                      |
| 562                         | Jan. 5   | 33 03 30  | 77 53 00 | 29     | co. s. bk. sh.       |
| 563                         | Jan. 5   | 32 59 15  | 77 55 30 | 62     | yl. s. bk. sh.       |
| 564                         | Jan. 5   | 32 57 30  | 77 56 30 | 66     | co. s. bk. sh.       |
| Gulf of Mexico.             |          |           |          |        |                      |
| 565                         | Jan. 22  | 21 00 00  | 86 24 30 | 92     | co.                  |
| 566                         | Feb. 7   | 29 31 00  | 85 36 20 | 16     | fne. wh. s.          |
| 567                         | Feb. 7   | 29 28 00  | 85 36 50 | 16     | fne. wh. s.          |
| 568                         | Feb. 7   | 29 25 00  | 85 37 20 | 15     | fne. s. bk. sh.      |
| 569                         | Feb. 7   | 29 16 30  | 85 34 00 | 27     | gy. s. bk. sh.       |
| 570                         | Feb. 7   | 29 15 19  | 85 34 00 | 30     | gy. s. bk. sh.       |
| 571                         | Feb. 11  | 29 26 45  | 87 44 00 | 34     | fne. blk. s.         |
| 572                         | Feb. 11  | 29 22 00  | 87 46 30 | 43     | crs. gy. s.          |
| 573                         | Feb. 11  | 29 17 30  | 87 49 00 | 99     | bu. m.               |
| 574                         | Feb. 11  | 29 13 00  | 87 51 30 | 206    | blk. m.              |
| 575                         | Feb. 11  | 29 08 30  | 87 54 00 | 362    | blk. m.              |
| 576                         | Feb. 11  | 29 04 00  | 87 56 30 | 599    | gn. m.               |
| 577                         | Feb. 11  | 28 58 15  | 88 00 00 | 740    | bu. m.               |
| 578                         | Feb. 11  | 28 54 00  | 88 02 30 | 698    | gy. m.               |
| 579                         | Feb. 11  | 28 56 30  | 87 58 30 | 747    | gy. m.               |
| 580                         | Feb. 11  | 28 59 00  | 87 55 30 | 611    | gy. m.               |
| 581                         | Feb. 11  | 29 02 45  | 87 53 00 | 737    | gn. m.               |
| 582                         | Feb. 11  | 28 59 30  | 88 06 00 | 573    | gn. m.               |
| 583                         | Feb. 11  | 28 58 20  | 88 14 00 | 486    | gn. m.               |
| 584                         | Feb. 11  | 29 19 30  | 88 11 30 | 46     | gy. m.               |
| 585                         | Feb. 11  | 29 21 45  | 88 14 00 | 35     | gy. s.               |
| 586                         | Feb. 11  | 29 22 30  | 88 17 00 | 32     | gy. s. m.            |
| 587                         | Feb. 11  | 29 22 15  | 88 21 00 | 30     | gn. m.               |
| 588                         | Feb. 11  | 29 17 30  | 88 21 00 | 36     | gn. m.               |
| 589                         | Mar. 4   | 29 17 15  | 88 05 30 | 51     | bu. m.               |
| 590                         | Mar. 4   | 29 22 00  | 88 04 30 | 40     | bu. m. blk. sp.      |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.      | Date.   | Position. |          | Temperature. |               |              | Depth. | Character of bottom.         |
|-----------------|---------|-----------|----------|--------------|---------------|--------------|--------|------------------------------|
|                 |         | Lat. N.   | Long. W. | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                              |
| Gulf of Mexico. |         |           |          |              |               |              |        |                              |
|                 | 1885.   | ° ' "     | ° ' "    | ° F.         | ° F.          | ° F.         | Fms.   |                              |
| 591             | Mar. 4  | 29 28 00  | 88 03 00 | 60           | 60            | -----        | 25     | gy. s.                       |
| 592             | Mar. 4  | 29 24 00  | 87 52 00 | 64           | 62            | -----        | 36     | fne. gy. s. bk. sp.          |
| 593             | Mar. 4  | 29 33 00  | 87 39 00 | 61           | 60            | -----        | 25     | crs. s. bk. sp. brk. sh.     |
| 594             | Mar. 4  | 29 36 30  | 87 36 00 | 60           | 61            | -----        | 22     | fne. wh. s.                  |
| 595             | Mar. 4  | 29 40 30  | 87 32 30 | 59           | 60            | -----        | 22     | fne. wh. s.                  |
| 596             | Mar. 7  | 29 16 19  | 85 49 30 | 58           | 64            | -----        | 30     | gy. s. bk. sp. brk. sh.      |
| 597             | Mar. 7  | 29 16 00  | 85 47 30 | 58           | 64            | -----        | 29     | yl. s. bk. sp. brk. sh.      |
| 598             | Mar. 7  | 29 17 20  | 85 45 30 | 58           | 64            | -----        | 31     | yl. s. bk. sp. brk. sh.      |
| 599             | Mar. 7  | 29 18 40  | 85 43 30 | 61           | 62            | -----        | 30     | yl. s. bk. sp. brk. sh.      |
| 600             | Mar. 7  | 29 20 00  | 85 41 30 | 60           | 61            | -----        | 27     | yl. s. bk. sp. brk. sh.      |
| 601             | Mar. 7  | 29 19 00  | 85 41 45 | 60           | 61            | -----        | 29     | yl. s. bk. sp. brk. sh.      |
| 602             | Mar. 7  | 29 18 15  | 85 41 00 | 60           | 61            | -----        | 28     | yl. s. bk. sp. brk. sh.      |
| 603             | Mar. 7  | 29 17 30  | 85 40 15 | 61           | 60            | -----        | 29     | yl. s. bk. sp. brk. sh.      |
| 604             | Mar. 7  | 29 16 45  | 85 39 30 | 61           | 60            | -----        | 28     | yl. s. bk. sp. brk. sh.      |
| 605             | Mar. 7  | 29 16 00  | 85 38 45 | 61           | 60            | -----        | 31     | yl. s. bk. sp. brk. sh.      |
| 606             | Mar. 7  | 29 15 11  | 85 38 00 | 61           | 60            | -----        | 33     | gy. s. bk. sp.               |
| 607             | Mar. 7  | 29 15 10  | 85 37 00 | 61           | 60            | -----        | 32     | fne. gy. s. bk. sp.          |
| 608             | Mar. 7  | 29 15 10  | 85 36 00 | 63           | 61            | -----        | 31     | fne. gy. s. bk. sp.          |
| 609             | Mar. 7  | 29 15 40  | 85 35 15 | 65           | 62            | -----        | 29     | fne. gy. s.                  |
| 610             | Mar. 7  | 29 16 15  | 85 34 30 | 65           | 62            | -----        | 25     | crs. r. bk. s. sh.           |
| 611             | Mar. 7  | 29 15 00  | 85 34 30 | 65           | 63            | -----        | 27     | wh. s. bk. sp. sh.           |
| 612             | Mar. 7  | 29 14 00  | 85 33 30 | 65           | 63            | -----        | 27     | fne. s. bk. sp.              |
| 613             | Mar. 7  | 29 13 00  | 85 32 30 | 65           | 63            | -----        | 26     | fne. wh. s. bk. sp.          |
| 614             | Mar. 7  | 29 12 30  | 85 32 00 | 65           | 63            | -----        | 26     | crs. s. bk. sp. sh.          |
| 615             | Mar. 7  | 29 15 10  | 85 34 30 | 65           | 64            | -----        | 29     | fne. wh. s. bk. sp.          |
| 616             | Mar. 7  | 29 16 30  | 85 36 00 | 65           | 64            | -----        | 29     | fne. wh. s. bk. sp.          |
| 617             | Mar. 7  | 29 17 10  | 85 36 30 | 64           | 64            | -----        | 27     | fne. wh. s. bk. sp.          |
| 618             | Mar. 7  | 29 17 50  | 85 37 00 | 63           | 64            | -----        | 27     | fne. s. bk. sp. brk. sh.     |
| 619             | Mar. 7  | 29 18 30  | 85 37 30 | 63           | 64            | -----        | 28     | gy. bk. s. brk. sh.          |
| 620             | Mar. 7  | 29 19 15  | 85 38 00 | 63           | 64            | -----        | 26     | gy. bk. s. brk. sh.          |
| 621             | Mar. 7  | 29 19 40  | 85 39 20 | 63           | 63            | -----        | 26     | gy. bk. s. brk. sh.          |
| 622             | Mar. 7  | 29 20 05  | 85 40 40 | 63           | 63            | -----        | 26     | gy. bk. s. brk. sh.          |
| 623             | Mar. 7  | 29 20 30  | 85 42 00 | 63           | 63            | -----        | 26     | gy. bk. s. brk. sh.          |
| 624             | Mar. 7  | 29 19 45  | 85 42 50 | 62           | 63            | -----        | 28     | gy. bk. s. brk. sh.          |
| 625             | Mar. 7  | 29 19 20  | 85 43 15 | 62           | 63            | -----        | 28     | gy. bk. s. brk. sh.          |
| 626             | Mar. 7  | 29 19 00  | 85 43 15 | 62           | 63            | -----        | 28     | gy. bk. s. brk. sh.          |
| 627             | Mar. 8  | 29 16 15  | 85 42 30 | 58           | 60            | -----        | 30     | gy. bk. s. brk. sh.          |
| 628             | Mar. 8  | 29 16 45  | 85 41 00 | 56           | 59            | -----        | 29     | gy. bk. s. brk. sh.          |
| 629             | Mar. 8  | 29 15 30  | 85 40 15 | 57           | 60            | -----        | 29     | gy. bk. s. brk. sh.          |
| 630             | Mar. 8  | 29 17 45  | 85 42 00 | 57           | 60            | -----        | 31     | gy. bk. s. brk. sh.          |
| 631             | Mar. 8  | 29 20 30  | 85 44 00 | 57           | 60            | -----        | 27     | gy. bk. s. brk. sh.          |
| 632             | Mar. 8  | 29 19 30  | 85 45 00 | 57           | 60            | -----        | 29     | gy. bk. s. brk. sh.          |
| 633             | Mar. 8  | 29 20 15  | 85 45 40 | 57           | 60            | -----        | 29     | gy. bk. s. brk. sh.          |
| 634             | Mar. 8  | 29 21 00  | 85 46 20 | 56           | 60            | -----        | 28     | g. brk. s. sh.               |
| 635             | Mar. 8  | 28 51 20  | 85 10 00 | 64           | 65            | -----        | 31     | gy. s. brk. sh.              |
| 636             | Mar. 8  | 28 52 10  | 85 09 20 | 64           | 65            | -----        | 30     | crs. gy. s. brk. sh.         |
| 637             | Mar. 8  | 28 53 00  | 85 08 40 | 64           | 65            | -----        | 29     | gy. s. brk. sh.              |
| 638             | Mar. 8  | 28 54 00  | 85 08 00 | 63           | 65            | -----        | 28     | gy. s. bk. sp. brk. sh.      |
| 639             | Mar. 15 | 28 48 00  | 84 36 00 | 64           | 63            | -----        | 24     | s. co. brk. sh.              |
| 640             | Mar. 15 | 28 47 00  | 84 35 50 | 63           | 62            | -----        | 24     | s. co. brk. sh.              |
| 641             | Mar. 15 | 28 46 00  | 84 35 40 | 62           | 61            | -----        | 23     | s. co. brk. sh.              |
| 642             | Mar. 15 | 28 45 00  | 84 35 30 | 61           | 60            | -----        | 24     | s. co. brk. sh.              |
| 643             | Mar. 15 | 28 44 00  | 84 35 20 | 60           | 59            | -----        | 24     | s. co.                       |
| 644             | Mar. 15 | 28 43 00  | 84 35 30 | 60           | 62            | 62.1         | 24     | s. co. brk. sh.              |
| 645             | Mar. 15 | 28 42 00  | 84 35 40 | 60           | 61            | -----        | 26     | s. bk. sp. brk. sh.          |
| 646             | Mar. 15 | 28 41 30  | 84 35 50 | 60           | 61            | -----        | 26     | crs. bk. gy. s. co.          |
| 647             | Mar. 15 | 28 41 00  | 84 36 00 | 60           | 61            | -----        | 27     | gy. s. bk. sp. co.           |
| 648             | Mar. 15 | 28 40 45  | 84 35 30 | 59           | 61            | -----        | 26     | wh. s. bk. sp. brk. sh.      |
| 649             | Mar. 15 | 28 40 00  | 84 32 40 | 58           | 62            | -----        | 26     | wh. s. brk. sh.              |
| 650             | Mar. 15 | 28 42 00  | 84 29 50 | 58           | 62            | -----        | 24     | yl. s. bk. sp. brk. sh.      |
| 651             | Mar. 15 | 28 43 20  | 84 28 00 | 58           | 62            | -----        | 22     | co.                          |
| 652             | Mar. 15 | 28 44 00  | 84 27 00 | 58           | 62            | -----        | 23     | fne. wh. s. brk. sh.         |
| 653             | Mar. 15 | 28 44 40  | 84 26 00 | 58           | 62            | -----        | 21     | crs. gy. s.                  |
| 654             | Mar. 16 | 28 50 00  | 84 32 30 | 59           | 62            | -----        | 21     | brk. sh.                     |
| 655             | Mar. 16 | 28 45 00  | 84 33 15 | 59           | 62            | -----        | 24     | fne. wh. s. bk. sp. brk. sh. |
| 656             | Mar. 16 | 28 40 00  | 84 32 00 | 60           | 63            | -----        | 27     | fne. wh. s. bk. sp.          |
| 657             | Mar. 16 | 28 38 45  | 84 28 30 | 59           | 63            | -----        | 24     | fne. wh. s. brk. sh.         |
| 658             | Mar. 16 | 28 32 45  | 84 27 00 | 60           | 64            | -----        | 24     | crs. gy. s. brk. sh.         |
| 659             | Mar. 16 | 28 25 00  | 84 21 00 | 62           | 63            | -----        | 24     | crs. s. bk. sp. sh.          |
| 660             | Mar. 16 | 28 21 00  | 84 18 00 | 62           | 63            | -----        | 23     | crs. s. bk. sp. sh.          |
| 661             | Mar. 16 | 28 20 00  | 84 12 00 | 62           | 63            | -----        | 22     | gy. s.                       |
| 662             | Mar. 16 | 28 19 45  | 84 06 00 | 59           | 63            | -----        | 21     | wh. s. bk. sp. brk. sh.      |
| 663             | Mar. 16 | 28 15 45  | 84 02 35 | 60           | 62            | -----        | 21     | wh. s. bk. sp. brk. sh.      |
| 664             | Mar. 16 | 28 11 45  | 83 59 10 | 61           | 63            | -----        | 22     | wh. s. bk. sp. brk. sh.      |
| 665             | Mar. 16 | 28 07 45  | 83 55 40 | 60           | 64            | -----        | 22     | wh. s. bk. sp.               |
| 666             | Mar. 16 | 28 03 45  | 83 52 15 | 60           | 64            | -----        | 22     | fne. gy. s. bk. sp.          |
| 667             | Mar. 16 | 27 59 40  | 83 48 50 | 60           | 63            | -----        | 22     | crs. s. brk. sh.             |
| 668             | Mar. 16 | 27 55 30  | 83 45 25 | 60           | 63            | -----        | 22     | gy. bk. s.                   |
| 669             | Mar. 16 | 27 51 30  | 83 42 00 | 60           | 63            | -----        | 21     | fne. wh. s. bk. sp.          |
| 670             | Mar. 16 | 27 50 00  | 83 36 15 | 60           | 62            | -----        | 20     | wh. s. bk. sp.               |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.                     | Date.   | Position. |          | Temperature. |               |              | Depth. | Character of bottom.         |
|--------------------------------|---------|-----------|----------|--------------|---------------|--------------|--------|------------------------------|
|                                |         | Lat. N.   | Long. W. | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                              |
| Gulf of Mexico.                |         |           |          |              |               |              |        |                              |
|                                | 1885.   | ° ' "     | ° ' "    | ° F.         | ° F.          | ° F.         | Fms.   |                              |
| 671                            | Mar. 16 | 27 49 00  | 83 30 30 | 60           | 61            | -----        | 18     | crs. s. bk. sp. brk. sh.     |
| 672                            | Mar. 16 | 27 48 10  | 83 24 45 | 60           | 66            | -----        | 16½    | gy. s. brk. sh.              |
| 673                            | Mar. 16 | 27 47 30  | 83 19 00 | 60           | 62            | -----        | 15     | gy. s. bk. sp.               |
| 674                            | Mar. 16 | 27 46 45  | 83 13 15 | 60           | 62            | -----        | 12     | crs. gy. s. bk. sp. brk. sh. |
| 675                            | Mar. 16 | 27 46 10  | 83 07 30 | 60           | 62            | -----        | 10     | crs. gy. s. bk. sp.          |
| 676                            | Mar. 16 | 27 46 00  | 83 02 00 | 60           | 62            | -----        | 8      | gy. s. bk. sp. brk. sh.      |
| 677                            | Mar. 18 | 27 16 00  | 83 10 00 | 65           | 64            | -----        | 18     | gy. bk. s.                   |
| 678                            | Mar. 18 | 27 08 30  | 83 19 30 | 67           | 66            | -----        | 25     | crs. gy. bk. s.              |
| 679                            | Mar. 18 | 26 58 00  | 83 22 30 | 68           | 66            | -----        | 26     | crs. gy. s. brk. sh.         |
| 680                            | Mar. 18 | 26 53 00  | 83 24 00 | 67           | 66            | -----        | 27     | wh. s. bk. sp. brk. sh.      |
| 681                            | Mar. 18 | 26 42 30  | 83 22 45 | 80           | 67            | -----        | 29     | crs. s. bk. sp. brk. sh.     |
| 682                            | Mar. 18 | 26 38 00  | 83 20 00 | 73           | 67            | -----        | 28     | crs. s. bk. sp.              |
| 683                            | Mar. 19 | 26 28 15  | 83 11 00 | 63           | 67            | -----        | 26     | fne. wh. s. bk. sp.          |
| 684                            | Mar. 19 | 26 23 15  | 83 11 15 | 61           | 67            | -----        | 28     | crs. gy. s. bk. sp. brk. sh. |
| 685                            | Mar. 19 | 26 12 30  | 83 06 30 | 63           | 66            | -----        | 27     | crs. gy. s. bk. sp. brk. sh. |
| 686                            | Mar. 19 | 26 08 30  | 83 03 45 | 63           | 66            | -----        | 25     | fne. wh. s. bk. sp. brk. sh. |
| 687                            | Mar. 19 | 26 04 30  | 83 01 00 | 63           | 66            | -----        | 24     | fne. wh. s. bk. sp. brk. sh. |
| 688                            | Mar. 19 | 25 54 00  | 82 59 30 | 67           | 66            | -----        | 24     | fne. wh. s.                  |
| 689                            | Mar. 19 | 25 49 00  | 83 01 00 | 66           | 67            | -----        | 25     | fne. wh. s.                  |
| 690                            | Mar. 19 | 25 44 30  | 83 02 30 | 67           | 68            | -----        | 27     | s. co.                       |
| 691                            | Mar. 19 | 25 29 30  | 83 01 00 | 68           | 69            | -----        | 27     | gy. s. brk. sh.              |
| 692                            | Mar. 19 | 25 34 30  | 83 01 00 | 67           | 69            | -----        | 27     | gy. s. bk. sp.               |
| 693                            | Mar. 19 | 25 29 30  | 83 01 00 | 67           | 69            | -----        | 28     | crs. gy. s. brk. sh.         |
| 694                            | Mar. 19 | 25 24 30  | 83 00 00 | 67           | 69            | -----        | 27     | gy. s. bk. sp.               |
| 695                            | Mar. 19 | 25 19 30  | 82 59 30 | 68           | 69            | -----        | 27     | gy. m. brk. sh.              |
| 696                            | Mar. 19 | 25 14 30  | 82 59 00 | 68           | 69            | -----        | 27     | gy. m. fne. s. brk. sh.      |
| 697                            | Mar. 19 | 25 09 30  | 82 59 00 | 67           | 69            | -----        | 27     | brk. sh.                     |
| Savannah to Cape Hatteras.     |         |           |          |              |               |              |        |                              |
| 698                            | Apr. 1  | 31 55 00  | 79 20 00 | 66           | 69            | 60.8         | 54     | gy. bk. s. brk. sh.          |
| 699                            | Apr. 1  | 31 54 45  | 79 17 00 | 66           | 69            | 60.3         | 86     | gy. m. brk. sh.              |
| 700                            | Apr. 2  | 33 21 30  | 77 09 00 | 64           | 70            | 66.8         | 71     | gy. s.                       |
| 701                            | Apr. 2  | 33 35 00  | 76 42 15 | 65           | 72            | 65.2         | 91     | fne. gy. s.                  |
| 702                            | Apr. 3  | 36 30 00  | 73 14 00 | 69           | 72            | 36.8         | 2,340  | bu. oz.                      |
| 703                            | Apr. 4  | 36 45 00  | 73 28 00 | 68           | 66            | 37.2         | 1,646  | bu. oz.                      |
| 704                            | Apr. 4  | 36 57 30  | 73 47 00 | 61           | 55            | 37.5         | 1,436  | bu. oz.                      |
| 705                            | Apr. 4  | 37 01 08  | 74 10 00 | 50           | 52            | 38.7         | 1,208  | bu. oz.                      |
| 706                            | Apr. 4  | 37 09 23  | 74 30 30 | 45           | 46            | -----        | 336    | gn. m.                       |
| 707                            | Apr. 5  | 37 03 00  | 74 39 00 | 42           | 46            | -----        | 50     | fne. yl. s. bk. sp.          |
| 708                            | Apr. 5  | 37 03 45  | 74 37 10 | 42           | 46            | 46.8         | 51     | fne. yl. s. bk. sp.          |
| 709                            | Apr. 5  | 37 03 40  | 74 35 00 | 42           | 47            | 46.8         | 54     | yl. s. bk. sp. brk. sh.      |
| 710                            | Apr. 5  | 37 03 30  | 74 33 30 | 42           | 47            | 47.7         | 59     | g. crs. s. brk. sh.          |
| 711                            | Apr. 5  | 37 03 00  | 74 33 00 | 42           | 49            | -----        | 67     | (Lost lead.)                 |
| 712                            | Apr. 5  | 37 04 30  | 74 32 00 | 43           | 49            | -----        | 98     | bk. s.                       |
| 713                            | Apr. 5  | 37 05 00  | 74 57 30 | 42           | 44            | 43           | 24     | gy. s. brk. sh.              |
| 714                            | Apr. 5  | 37 02 30  | 75 22 00 | 43           | 40            | 40.5         | 17     | fne. wh. s. bk. sp.          |
| 715                            | Apr. 5  | 36 59 00  | 75 45 00 | 44           | 42            | 41.3         | 9      | fne. gy. s. bk. sp.          |
| 716                            | Apr. 5  | 36 57 30  | 75 58 00 | 46           | 43            | 42           | 6      | gy. bk. s.                   |
| 717                            | Apr. 5  | 37 07 30  | 76 08 30 | 50           | 44            | 42.5         | 6½     | m. brk. sh.                  |
| 718                            | Apr. 5  | 37 32 00  | 76 08 00 | 48           | 44            | 40.5         | 7½     | gn. m.                       |
| 719                            | Apr. 6  | 37 54 00  | 76 09 00 | 50           | 42            | 37.7         | 14     | bu. m.                       |
| 720                            | Apr. 6  | 38 07 30  | 76 32 00 | 52           | 43            | 38.7         | 12     | bu. m.                       |
| 721                            | June 3  | 37 07 30  | 74 34 00 | 61           | 60            | -----        | 75     | fne. gy. s.                  |
| 722                            | June 3  | 37 08 00  | 74 34 45 | 61           | 61            | 54           | 61     | crs. gy. sp.                 |
| 723                            | June 3  | 37 08 20  | 74 34 00 | 66           | 67            | 52.5         | 68     | crs. gy. bk. brk. sh.        |
| 724                            | June 3  | 37 09 30  | 74 33 45 | 67           | 67            | 52.5         | 75     | crs. gy. s. bk. sp. brk. sh. |
| 725                            | June 3  | 37 10 15  | 74 31 00 | 65           | 67            | -----        | 307    | gn. m.                       |
| 726                            | June 3  | 37 11 30  | 74 32 30 | 65           | 67            | 51.5         | 103    | gy. m. crs. s. bk. sp.       |
| 727                            | June 4  | 36 40 30  | 74 42 00 | 69           | 68            | 48.8         | 135    | m. fne. bk. s.               |
| 728                            | June 4  | 36 43 00  | 74 41 00 | 74           | 69            | 48.8         | 160    | bk. m.                       |
| 729                            | June 4  | 36 43 00  | 74 42 00 | 75           | 70            | 52           | 98     | brk. sh. g.                  |
| 730                            | June 4  | 36 43 00  | 74 46 30 | 75           | 70            | -----        | 78     | s. g.                        |
| 731                            | June 5  | 35 26 00  | 74 42 00 | 75           | 76            | 39.5         | 87     | gy. m.                       |
| 732                            | June 5  | 35 26 30  | 74 44 00 | 76           | 74            | 40.5         | 388    | bk. m.                       |
| 733                            | June 5  | 35 27 00  | 74 46 00 | 76           | 74            | 44           | 210    | bk. m.                       |
| 734                            | June 5  | 35 27 15  | 74 42 30 | 72           | 75            | 54           | 69     | bk. m.                       |
| 735                            | June 5  | 35 12 00  | 75 09 30 | 75           | 75            | 72.5         | 17     | gy. s. brk. sh.              |
| 736                            | June 5  | 35 12 15  | 75 05 00 | 76           | 76            | 65           | 50½    | fne. gy. s. bk. sp. brk. sh. |
| 737                            | June 5  | 35 12 30  | 75 03 30 | 76           | 76            | 60           | 72     | crs. gy. s. brk. sh.         |
| 738                            | June 5  | 35 12 45  | 75 02 00 | 76           | 76            | 60           | 68     | r. co.                       |
| 739                            | June 5  | 35 13 00  | 75 01 00 | 76           | 76            | 53           | 123    | gy. s. bk. sp. brk. sh.      |
| 740                            | June 5  | 35 11 00  | 75 07 00 | 78           | 75            | 65           | 52     | crs. gy. s. bk. sp.          |
| 741                            | June 6  | 34 58 00  | 75 12 00 | 66           | 75            | 58           | 66     | fne. gy. s. bk. sp.          |
| 742                            | June 6  | 34 59 00  | 75 13 00 | 66           | 75            | 61           | 54     | fne. gy. s. bk. sp.          |
| Cape Cod to New-<br>foundland. |         |           |          |              |               |              |        |                              |
| 743                            | June 19 | 41 15 30  | 64 23 00 | 66           | 69            | 37.1         | 1,915  | yl. oz.                      |
| 744                            | June 19 | 41 18 15  | 63 55 00 | 68           | 66            | -----        | 2,044  | yl. oz.                      |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.                     | Date.   | Position. |          | Temperature. |               |              | Depth. | Character of bottom.    |
|--------------------------------|---------|-----------|----------|--------------|---------------|--------------|--------|-------------------------|
|                                |         | Lat. N.   | Long. W. | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                         |
| Cape Cod to New-<br>foundland. |         |           |          |              |               |              |        |                         |
| 1885.                          |         |           |          |              |               |              |        |                         |
| 745                            | June 19 | 41 19 23  | 63 35 30 | 71           | 69            | 37           | 2,071  | gy. oz.                 |
| 746                            | June 19 | 41 23 20  | 63 23 15 | 67           | 59            | 36.8         | 2,035  | br. oz.                 |
| 747                            | June 19 | 41 26 15  | 63 15 00 | 63           | 57            | 36.8         | 2,020  | br. oz.                 |
| 748                            | June 19 | 41 22 00  | 63 10 00 | 61           | 60            | 36.7         | 2,094  | yl. oz.                 |
| 749                            | June 19 | 41 20 30  | 62 57 00 | 61           | 61            | 37           | 2,178  | gy. oz.                 |
| 750                            | June 20 | 40 40 30  | 60 33 00 | 63           | 75            | 36.5         | 2,995  | yl. oz.                 |
| 751                            | June 21 | 40 21 00  | 56 27 00 | 64           | 68            | 37.8         | 3,103  | gy. oz.                 |
| 752                            | June 21 | 40 24 30  | 54 24 00 | 78           | 74            | 36.8         | 2,957  | gy. oz.                 |
| 753                            | June 21 | 40 18 00  | 53 39 30 | 66           | 70            | 36.8         | 2,863  | gy. oz.                 |
| 754                            | June 22 | 40 16 00  | 53 16 30 | 66           | 69            | 37           | 2,882  | gy. oz.                 |
| 755                            | June 22 | 40 13 00  | 53 02 00 | 66           | 70            | 38.6         | 2,897  | gy. oz.                 |
| 756                            | June 22 | 40 55 30  | 52 02 30 | 71           | 67            | 36.8         | 2,873  | gy. oz.                 |
| 757                            | June 22 | 41 51 00  | 51 31 00 | 56           | 54            | 38.3         | 2,118  | gy. oz.                 |
| 758                            | June 23 | 42 18 30  | 51 16 00 | 51           | 52            | 37.2         | 1,499  | gy. oz.                 |
| 759                            | June 23 | 42 37 00  | 51 05 30 | 51           | 50            | 38           | 1,070  | gn. oz.                 |
| 760                            | June 23 | 42 51 30  | 50 55 00 | 52           | 45            | 38.7         | 970    | hrd.                    |
| 761                            | June 23 | 42 56 00  | 50 50 00 | 51           | 45            | 38.7         | 309    | gn. m. s.               |
| 762                            | June 24 | 43 38 00  | 49 42 00 | 53           | 48            | 39.2         | 30     | s. brk. sh.             |
| 763                            | June 24 | 43 38 00  | 49 34 30 | 53           | 48            | 36           | 38     | wh. s. bk. sp. brk. sh. |
| 764                            | June 24 | 43 38 00  | 49 27 00 | 53           | 49            | -----        | 125    | gn. m. crs. gy. s.      |
| 765                            | June 24 | 44 26 00  | 49 33 00 | 51           | 45            | 35.1         | 34     | wh. s. brk. sh.         |
| 766                            | June 24 | 44 57 00  | 49 38 00 | 46           | 44            | 32.7         | 36     | wh. s. brk. sh.         |
| 767                            | June 25 | 46 29 00  | 49 39 30 | 48           | 43            | 34.4         | 39     | gy. s.                  |
| 768                            | July 2  | 46 02 30  | 53 26 00 | 48           | 47            | 29.5         | 76     | crs. gy. bk. s.         |
| 769                            | July 3  | 45 54 00  | 53 53 00 | 49           | 47            | 29.5         | 78     | dk. gn. s. brk. sh.     |
| 770                            | July 3  | 45 52 00  | 53 59 00 | 49           | 47            | 29.5         | 75     | fne. gy. s.             |
| 771                            | July 3  | 45 49 45  | 54 06 30 | 50           | 46            | 29.7         | 67     | bk. s.                  |
| 772                            | July 4  | 44 21 30  | 56 52 15 | 56           | 52            | 38.7         | 761    | gy. oz.                 |
| 773                            | July 4  | 44 22 50  | 56 56 30 | 59           | 54            | 38.7         | 795    | gy. oz.                 |
| 774                            | July 4  | 44 24 10  | 57 00 40 | 59           | 53            | 38.7         | 566    | hrd.                    |
| 775                            | July 4  | 44 25 30  | 57 04 45 | 59           | 53            | 39.7         | 366    | gy. oz. p.              |
| 776                            | July 4  | 44 26 00  | 57 06 15 | 59           | 53            | 39.7         | 454    | gy. oz.                 |
| 777                            | July 4  | 44 27 00  | 57 09 15 | 59           | 53            | 40           | 333    | crs. s. g.              |
| 778                            | July 4  | 44 30 30  | 57 12 45 | 54           | 51            | -----        | 99     | crs. s. p.              |
| 779                            | July 5  | 44 05 15  | 57 14 15 | 54           | 54            | -----        | 346    | gy. c.                  |
| 780                            | July 5  | 44 05 15  | 57 15 30 | 54           | 54            | -----        | 375    | s. brk. co.             |
| 781                            | July 5  | 44 06 00  | 57 17 00 | 53           | 52            | -----        | 90     | wh. s. p.               |
| 782                            | July 5  | 44 06 30  | 57 17 00 | 54           | 52            | -----        | 142    | hrd. wh. s.             |
| 783                            | July 5  | 44 11 00  | 57 14 45 | 55           | 53            | -----        | 183    | p.                      |
| 784                            | July 5  | 44 13 30  | 57 13 45 | 55           | 53            | -----        | 155    | lge. p.                 |
| 785                            | July 5  | 44 24 45  | 57 10 15 | 59           | 54            | -----        | 204    | gy. s.                  |
| 786                            | July 5  | 44 26 30  | 57 10 45 | 57           | 54            | -----        | 175    | crs. s.                 |
| 787                            | July 5  | 44 28 30  | 57 10 45 | 57           | 54            | -----        | 186    | fne. s.                 |
| 788                            | July 5  | 44 28 30  | 57 12 45 | 57           | 54            | 39.7         | 145    | fne. gy. s.             |
| 789                            | July 5  | 44 29 00  | 57 14 45 | 57           | 54            | -----        | 40     | hrd. crs. p.            |
| 790                            | July 5  | 44 31 00  | 57 14 45 | 57           | 54            | -----        | 42     | hrd. crs. p.            |
| 791                            | July 5  | 44 33 00  | 57 14 45 | 57           | 54            | -----        | 48     | fne. wh. s.             |
| 792                            | July 5  | 44 35 00  | 57 14 45 | 57           | 54            | -----        | 90     | yl. s.                  |
| 793                            | July 5  | 44 35 00  | 57 12 15 | 56           | 53            | -----        | 188    | m. fne. s.              |
| 794                            | July 5  | 44 39 00  | 57 17 00 | 55           | 53            | -----        | 124    | wh. s.                  |
| 795                            | July 6  | 45 03 00  | 57 56 00 | 50           | 52            | 32           | 39     | hrd.                    |
| 796                            | July 6  | 45 16 00  | 58 11 45 | 50           | 52            | 33.5         | 75     | wh. s.                  |
| 797                            | July 6  | 45 21 30  | 58 18 45 | 50           | 52            | 32           | 54     | rot. co.                |
| 798                            | July 6  | 45 27 00  | 58 28 45 | 50           | 52            | -----        | 45     | fne. wh. s. bk. sp.     |
| 799                            | July 6  | 45 24 00  | 58 36 45 | 51           | 53            | -----        | 67     | fne. m.                 |
| 800                            | July 6  | 45 21 30  | 58 44 45 | 51           | 53            | 32           | 42     | wh. s. p.               |
| 801                            | July 6  | 45 18 30  | 58 52 45 | 52           | 53            | -----        | 45     | yl. s.                  |
| 802                            | July 6  | 45 14 00  | 59 08 15 | 54           | 54            | -----        | 48     | s. g.                   |
| 803                            | July 6  | 45 09 30  | 59 25 15 | 54           | 54            | -----        | 43     | hrd.                    |
| 804                            | July 6  | 45 07 00  | 59 28 45 | 58           | 56            | -----        | 46     | yl. s.                  |
| 805                            | July 6  | 45 06 00  | 59 31 30 | 58           | 56            | 32.3         | 48     | yl. s.                  |
| 806                            | July 6  | 45 05 00  | 59 34 00 | 58           | 55            | -----        | 52     | yl. s.                  |
| 807                            | July 6  | 45 03 00  | 59 39 45 | 60           | 56            | -----        | 58     | yl. s.                  |
| 808                            | July 6  | 44 36 00  | 59 51 45 | 59           | 58            | 35.8         | 48     | yl. s. g.               |
| 809                            | July 6  | 44 32 30  | 59 46 45 | 59           | 58            | 35.3         | 70     | fne. wh. s.             |
| 810                            | July 7  | 44 40 00  | 59 53 45 | 58           | 58            | 34.8         | 48     | s. g.                   |
| 811                            | July 7  | 44 39 30  | 59 57 45 | 58           | 58            | -----        | 54     | s. brk. p.              |
| 812                            | July 7  | 44 38 00  | 60 03 45 | 58           | 58            | -----        | 57     | fne. gy. bk. s.         |
| 813                            | July 7  | 44 32 00  | 60 11 15 | 57           | 58            | -----        | 74     | s. g.                   |
| 814                            | July 7  | 44 28 00  | 60 16 15 | 59           | 58            | -----        | 33     | s. g.                   |
| 815                            | July 7  | 44 26 30  | 60 21 45 | 59           | 58            | -----        | 26     | s. g.                   |
| 816                            | July 7  | 44 19 00  | 60 40 45 | 60           | 57            | -----        | 63     | yl. s. p.               |
| 817                            | July 7  | 44 22 00  | 60 44 15 | 65           | 57            | 34.1         | 54     | yl. s.                  |
| 818                            | July 8  | 44 29 30  | 63 11 00 | 64           | 61            | 34.6         | 51     | hrd.                    |
| 819                            | July 8  | 44 30 30  | 63 19 00 | 65           | 61            | -----        | 40     | r.                      |
| 820                            | July 11 | 43 12 00  | 64 00 30 | 60           | 58            | 37.8         | 54     | hrd.                    |
| 820                            | July 11 | 43 12 00  | 64 00 30 | 60           | 58            | 37.8         | 54     | hrd.                    |
| 821                            | July 12 | 43 01 00  | 64 45 30 | 60           | 60            | 38.7         | 47     | hrd.                    |
| 822                            | July 12 | 42 12 30  | 65 14 00 | 61           | 62            | -----        | 100    | g.                      |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                        | Date.    | Position. |          | Temperature. |               |              | Depth. | Character of bottom.    |
|-----------------------------------|----------|-----------|----------|--------------|---------------|--------------|--------|-------------------------|
|                                   |          | Lat. N.   | Long. W. | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                         |
| Cape Cod to New<br>foundland.     |          |           |          |              |               |              |        |                         |
| 1885.                             |          |           |          |              |               |              |        |                         |
| 823                               | July 12  | 42 05 00  | 65 22 00 | 60           | 62            | -----        | 74     | crs. g.                 |
| 824                               | July 13  | 41 58 00  | 65 30 00 | 60           | 62            | -----        | 339    | bu. m.                  |
| 825                               | July 13  | 41 49 50  | 65 45 30 | 62           | 60            | 42.6         | 85     | s. g.                   |
| 826                               | July 13  | 41 49 30  | 65 45 30 | 63           | 60            | -----        | 82     | s. g.                   |
| 827                               | July 13  | 41 49 00  | 65 45 30 | 63           | 60            | 42.3         | 81     | s. g.                   |
| 828                               | July 13  | 41 47 00  | 65 47 15 | 63           | 60            | 42.6         | 75     | s. g.                   |
| 829                               | July 13  | 41 44 30  | 65 47 00 | 63           | 60            | 45.2         | 79     | stf. bu. c. g.          |
| 830                               | July 13  | 41 44 45  | 65 45 30 | 63           | 60            | 45.2         | 84     | s. g.                   |
| 831                               | July 13  | 41 42 45  | 65 45 45 | 63           | 60            | -----        | 83     | s. g.                   |
| 832                               | July 13  | 41 42 00  | 65 45 30 | 65           | 66            | -----        | 84     | crs. s. g.              |
| 833                               | July 13  | 41 40 30  | 65 45 00 | 66           | 66            | -----        | 278    | wh. s. bk. sp.          |
| 834                               | July 13  | 41 42 30  | 65 44 15 | 66           | 66            | -----        | 363    | s. p.                   |
| 835                               | July 13  | 41 55 10  | 65 44 00 | 64           | 60            | 41.6         | 129    | crs. s. g.              |
| 836                               | July 13  | 41 55 50  | 65 42 30 | 64           | 60            | -----        | 136    | hrd.                    |
| 837                               | July 13  | 41 56 25  | 65 41 00 | 64           | 60            | -----        | 175    | brk. sh.                |
| 838                               | July 13  | 41 57 00  | 65 39 40 | 66           | 61            | -----        | 176    | brk. sh.                |
| 839                               | July 13  | 41 58 00  | 65 37 30 | 66           | 61            | -----        | 128    | p.                      |
| Nantucket to<br>Charleston, S. C. |          |           |          |              |               |              |        |                         |
| 840                               | Aug. 8   | 39 57 45  | 70 23 30 | 71           | 75            | 41.6         | 234    | gn. s.                  |
| 841                               | Aug. 8   | 40 00 45  | 70 24 00 | 71           | 75            | 46.2         | 154    | gn. s. bk. sp.          |
| 842                               | Aug. 8   | 39 59 00  | 70 22 45 | 71           | 74            | 45.7         | 167    | gn. s. bk. sp. brk. sh. |
| 843                               | Aug. 8   | 39 56 15  | 70 21 30 | 71           | 72            | 41.9         | 233    | gn. m. s.               |
| 844                               | Aug. 8   | 39 53 28  | 70 20 30 | 73           | 72            | 40.6         | 300    | gn. m. s.               |
| 845                               | Aug. 8   | 39 56 00  | 70 20 45 | 70           | 76            | 41.6         | 237    | gn. m.                  |
| 846                               | Aug. 8   | 39 51 30  | 70 15 30 | 76           | 76            | 43.9         | 344    | gn. m.                  |
| 847                               | Aug. 8   | 39 52 30  | 70 21 00 | 70           | 74            | 39.6         | 416    | stf. gn. m.             |
| 848                               | Aug. 9   | 39 54 15  | 70 29 00 | 71           | 76            | 41.6         | 315    | hrd.                    |
| 849                               | Aug. 9   | 39 49 00  | 70 42 00 | 71           | 77            | 39.6         | 452    | gy. m.                  |
| 850                               | Aug. 10  | 39 44 30  | 71 20 30 | 71           | 76            | 39.3         | 562    | gn. m.                  |
| 851                               | Aug. 10  | 39 47 15  | 71 24 30 | 71           | 76            | 39.6         | 397    | gy. oz.                 |
| 852                               | Aug. 10  | 39 49 40  | 71 27 30 | 69           | 74            | 40.6         | 298    | gn. oz.                 |
| 853                               | Aug. 10  | 39 52 00  | 71 30 30 | 72           | 75            | 43.6         | 206    | gn. m.                  |
| 854                               | Aug. 10  | 39 41 00  | 71 42 00 | 76           | 77            | 39.6         | 378    | gn. s.                  |
| 855                               | Aug. 31  | 38 45 00  | 68 04 00 | 72           | 75            | 36.4         | 1,949  | lt. bu. glob. oz.       |
| 856                               | Sept. 1  | 39 44 00  | 67 03 00 | 71           | 72            | 36.8         | 2,009  | gy. oz.                 |
| 857                               | Sept. 3  | 40 52 30  | 65 07 00 | 63           | 71            | -----        | 2,009  | yl. glob. oz.           |
| 858                               | Sept. 18 | 39 47 00  | 71 39 45 | 68           | 70            | -----        | 291    | gn. m.                  |
| 859                               | Sept. 19 | 39 04 00  | 72 23 00 | 71           | 72            | 38.5         | 659    | gn. m.                  |
| 860                               | Sept. 19 | 39 05 30  | 72 25 30 | 72           | 72            | 39           | 519    | gn. m.                  |
| 861                               | Sept. 20 | 39 04 00  | 72 16 00 | 70           | 72            | (a)          | 877    |                         |
| 862                               | Sept. 20 | 39 05 30  | 72 20 00 | 70           | 62            | 38.7         | 715    | gy. m.                  |
| 863                               | Sept. 21 | 39 04 30  | 73 02 00 | 67           | 70            | 48.8         | 47     | crs. gy. s. bk. sp.     |
| 864                               | Sept. 21 | 39 02 00  | 72 59 30 | 66           | 70            | 48.8         | 47     | crs. gy. s. bk. sp.     |
| 865                               | Sept. 21 | 38 58 30  | 72 55 00 | 66           | 70            | 50.9         | 55     | crs. dk. gy. s.         |
| 866                               | Oct. 17  | 35 02 00  | 75 09 30 | 70           | 79            | -----        | 197    | gy. m.                  |
| 867                               | Oct. 18  | 34 38 00  | 75 32 00 | 75           | 78            | 46.7         | 210    | gn. m.                  |
| 868                               | Oct. 20  | 33 40 30  | 77 37 00 | 76           | 77            | -----        | 15     | fne. gy. s. brk. sh.    |
| Bahama Islands.                   |          |           |          |              |               |              |        |                         |
| 1886.                             |          |           |          |              |               |              |        |                         |
| 869                               | Feb. 23  | 28 41 00  | 78 03 00 | 69           | 70            | 39.7         | 557    | gy. s. bk. sp.          |
| 870                               | Feb. 23  | 28 40 00  | 77 52 00 | 71           | 68            | 39.7         | 570    | gy. s. bk. sp.          |
| 871                               | Feb. 23  | 28 40 30  | 77 37 00 | 73           | 73            | 39.7         | 572    | gy. s. bk. sp.          |
| 872                               | Feb. 23  | 28 41 30  | 77 28 00 | 86           | 74            | 39.7         | 581    | gy. s. bk. sp.          |
| 873                               | Feb. 23  | 28 42 00  | 77 09 00 | 86           | 74            | 39.2         | 600    | wh. s.                  |
| 874                               | Feb. 23  | 28 42 30  | 76 53 30 | 71           | 70            | 39.2         | 623    | gy. s. bk. sp.          |
| 875                               | Feb. 23  | 28 42 45  | 76 39 00 | 67           | 70            | 39.7         | 762    | oz.                     |
| 876                               | Feb. 23  | 28 43 00  | 76 26 55 | 70           | 70            | 36.8         | 2,845  | oz.                     |
| 877                               | Feb. 24  | 28 34 42  | 76 10 25 | 68           | 69            | 36.8         | 3,196  | oz.                     |
| 878                               | Feb. 24  | 28 24 06  | 76 15 55 | 69           | 71            | 37.8         | 1,407  | No specimen.            |
| 879                               | Feb. 24  | 28 12 30  | 76 15 00 | 69           | 71            | 39.2         | 691    | gy. s.                  |
| 880                               | Feb. 24  | 28 01 00  | 76 13 00 | 69           | 71            | 39.2         | 622    | yl. oz. gy. s.          |
| 881                               | Feb. 24  | 27 49 00  | 76 12 00 | 70           | 71            | 39.5         | 633    | gy. and br. s.          |
| 882                               | Feb. 24  | 27 38 00  | 76 23 24 | 72           | 71            | 39.0         | 677    | br. s.                  |
| 883                               | Feb. 24  | 27 37 00  | 76 12 00 | 74           | 71            | 39.1         | 705    | gy. and br. s.          |
| 884                               | Feb. 24  | 27 42 00  | 76 02 00 | 70           | 72            | 39.2         | 762    | for.                    |
| 885                               | Feb. 24  | 27 51 00  | 75 53 30 | 71           | 73            | -----        | 2,599  | No specimen.            |
| 886                               | Feb. 25  | 27 30 00  | 75 35 00 | 70           | 71            | -----        | 2,761  | No specimen.            |
| 887                               | Feb. 26  | 25 29 00  | 74 50 00 | 73           | 72            | -----        | 2,589  | for. oz.                |
| 888                               | Feb. 26  | 24 50 00  | 74 36 45 | 74           | 73            | 36.7         | 2,709  | br. oz.                 |
| 889                               | Feb. 26  | 24 25 00  | 74 36 00 | 76           | 75            | 37.6         | 2,639  | br. oz.                 |
| 890                               | Feb. 26  | 24 08 00  | 74 35 00 | 74           | 73            | 38.6         | 1,135  | hrd.                    |
| 891                               | Feb. 27  | 23 57 00  | 74 36 30 | 77           | 75            | 43.8         | 535    | co.                     |
| 892                               | Feb. 27  | 23 50 00  | 74 38 00 | 77           | 76            | 38.2         | 1,264  | wh. s. co.              |
| 893                               | Feb. 27  | 23 43 00  | 74 39 30 | 79           | 77            | 38.2         | 1,263  | lt. br. oz.             |
| 894                               | Mar. 8   | 23 37 20  | 74 57 40 | 78           | 75            | 39.1         | 850    | co. s.                  |

a Wire parted, losing thermometer and 800 turns of wire.

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.               |          | Temperature. |               |              | Depth. | Character of bottom.        |
|------------|---------|-------------------------|----------|--------------|---------------|--------------|--------|-----------------------------|
|            |         | Lat. N.                 | Long. W. | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                             |
|            |         | <i>Bahamas to Cuba.</i> |          |              |               |              |        |                             |
|            | 1886.   | ° ' "                   | ° ' "    | ° F.         | ° F.          | ° F.         | Fms.   |                             |
| 895        | Mar. 8  | 23 42 20                | 74 59 30 | 78           | 75            | 40.1         | 657    | co. s.                      |
| 896        | Mar. 8  | 23 44 35                | 75 01 35 | 78           | 75            | 38.7         | 1,017  | co. s.                      |
| 897        | Mar. 8  | 23 46 30                | 75 03 50 | 78           | 75            | 42.3         | 578    | co. s.                      |
| 898        | Mar. 8  | 23 49 30                | 75 03 30 | 75           | 73            | 67.8         | 115    | wh. co. s.                  |
| 899        | Mar. 8  | 23 55 20                | 75 11 20 | 74           | 75            | 39.2         | 845    | co. s. bk. sp.              |
| 900        | Mar. 8  | 24 01 20                | 75 13 30 | 73           | 75            | 39.5         | 741    | wh. s. rd. and bk. sp. for. |
| 901        | Mar. 8  | 24 08 30                | 75 15 00 | 73           | 74            | 74.3         | 22     | wh. s. sp. and brk. sh.     |
| 902        | Mar. 8  | 24 09 00                | 75 06 00 | 72           | 74            | 37.2         | 2,194  | br. m. co. s.               |
| 903        | Mar. 8  | 24 08 00                | 74 56 30 | 72           | 74            | 36.7         | 2,482  | br. oz.                     |
| 904        | Mar. 9  | 24 08 00                | 74 45 00 | 72           | 74            | 36.5         | 2,255  | br. oz.                     |
| 905        | Mar. 9  | 24 07 00                | 74 38 00 | 72           | 74            | 36.7         | 2,061  | br. oz.                     |
| 906        | Mar. 9  | 23 35 00                | 74 47 30 | 78           | 75            | 65.1         | 149    | co. s. sh.                  |
| 907        | Mar. 10 | 23 37 00                | 75 06 30 | 71           | 74            | 38.4         | 1,398  | co. s.                      |
| 908        | Mar. 10 | 23 46 30                | 75 13 45 | 72           | 74            | 38.2         | 1,338  | co. s.                      |
| 909        | Mar. 10 | 23 43 45                | 75 20 45 | 72           | 74            | 48.3         | 448    | co. s.                      |
| 910        | Mar. 10 | 23 50 30                | 75 23 30 | 69           | 73            | 38.5         | 1,047  | co. s.                      |
| 911        | Mar. 10 | 23 56 30                | 75 26 30 | 68           | 73            | 38.3         | 1,211  | co. s.                      |
| 912        | Mar. 10 | 24 02 45                | 75 29 00 | 69           | 73            | 54.3         | 361    | co. s.                      |
| 913        | Mar. 10 | 24 06 30                | 75 30 45 | 70           | 73            | n. t.        | 273    | hrd. co. s.                 |
| 914        | Mar. 11 | 24 07 00                | 75 32 30 | 68           | 72            | n. t.        | 515    | co. s.                      |
| 915        | Mar. 11 | 24 01 15                | 75 38 45 | 67           | 72            | 38.6         | 1,051  | co. s. bk. sp.              |
| 916        | Mar. 11 | 23 55 20                | 75 45 10 | 68           | 73            | 38.6         | 1,056  | co. s.                      |
| 917        | Mar. 11 | 23 49 30                | 75 51 40 | 68           | 73            | 39.1         | 974    | co. s. bk. sp.              |
| 918        | Mar. 11 | 23 43 30                | 75 58 00 | 69           | 73            | 68.3         | 124    | co. s.                      |
| 919        | Mar. 11 | 23 52 00                | 76 00 15 | 67           | 73            | 39.1         | 863    | gy. oz.                     |
| 920        | Mar. 11 | 24 00 40                | 76 02 45 | 66           | 73            | 38.6         | 967    | wh. co. s.                  |
| 921        | Mar. 11 | 24 09 00                | 76 05 00 | 66           | 72            | 38.6         | 990    | wh. co. s.                  |
| 922        | Mar. 11 | 24 17 20                | 76 07 30 | 66           | 72            | 38.6         | 1,002  | wh. co. s.                  |
| 923        | Mar. 12 | 24 25 40                | 76 09 50 | 64           | 69            | 38.6         | 971    | gy. oz.                     |
| 924        | Mar. 12 | 24 33 40                | 76 11 20 | 65           | 71            | 38.6         | 937    | gy. oz.                     |
| 925        | Mar. 12 | 24 39 40                | 76 13 50 | 66           | 68            | 39.0         | 781    | co. s.                      |
| 926        | Mar. 13 | 24 36 30                | 76 12 00 | 72           | 71            | 39.0         | 899    | co. s.                      |
| 927        | Mar. 13 | 24 33 00                | 76 24 30 | 73           | 71            | 38.6         | 923    | co. s.                      |
| 928        | Mar. 13 | 24 29 00                | 76 31 15 | 73           | 72            | 39.1         | 801    | wh. oz.                     |
| 929        | Mar. 13 | 24 25 00                | 76 37 00 | 73           | 72            | 70.2         | 143    | wh. oz.                     |
| 930        | Mar. 13 | 24 33 00                | 76 35 30 | 76           | 73            | 38.8         | 842    | co. s.                      |
| 931        | Mar. 13 | 24 41 30                | 76 33 45 | 80           | 74            | 38.8         | 864    | co. s.                      |
| 932        | Mar. 13 | 24 49 20                | 76 32 15 | 80           | 74            | 39.1         | 764    | co. s.                      |
| 933        | Mar. 13 | 24 52 30                | 76 31 30 | 78           | 74            | 56.2         | 325    | gy. oz.                     |
| 934        | Mar. 13 | 24 35 20                | 76 02 45 | 75           | 74            | 46.5         | 476    | wh. oz.                     |
| 935        | Mar. 13 | 24 38 20                | 76 01 45 | 75           | 74            | n. t.        | 926    | wh. oz.                     |
| 936        | Mar. 13 | 24 46 50                | 75 55 45 | 74           | 73            | 36.7         | 1,965  | gy. oz.                     |
| 937        | Mar. 14 | 24 54 30                | 75 49 20 | 75           | 73            | 36.7         | 2,432  | br. oz.                     |
| 938        | Mar. 14 | 25 02 45                | 75 43 00 | 75           | 73            | 36.7         | 2,664  | br. oz.                     |
| 939        | Mar. 14 | 25 35 00                | 76 35 15 | 71           | 72            | n. t.        | 11     | co. s.                      |
| 940        | Mar. 14 | 25 35 30                | 76 34 30 | 71           | 72            | n. t.        | 14     | co. s.                      |
| 941        | Mar. 14 | 25 36 30                | 76 34 45 | 71           | 72            | n. t.        | 29     | co. s. rd. sp.              |
| 942        | Mar. 14 | 25 37 15                | 76 34 00 | 71           | 72            | n. t.        | 139    | hrd. co.                    |
| 943        | Mar. 14 | 25 40 15                | 76 29 15 | 73           | 72            | 38.1         | 1,927  | co. s.                      |
| 944        | Mar. 14 | 25 44 45                | 76 23 15 | 72           | 72            | 36.7         | 2,663  | br. oz.                     |
| 945        | Mar. 24 | 25 07 00                | 77 21 30 | 69           | 72            | n. t.        | 375    | co. s.                      |
| 946        | Mar. 24 | 25 15 30                | 77 24 45 | 71           | 73            | 38.4         | 1,409  | br. oz. co.                 |
| 947        | Mar. 24 | 25 25 30                | 77 27 50 | 70           | 74            | 39.1         | 1,490  | br. oz.                     |
| 948        | Mar. 24 | 25 35 30                | 77 27 45 | 69           | 74            | 39.1         | 1,079  | hrd. co. s.                 |
| 949        | Mar. 24 | 25 47 00                | 77 20 30 | 68           | 74            | 38.6         | 1,164  | hrd. co. s.                 |
| 950        | Mar. 24 | 25 53 15                | 77 33 00 | 65           | 71            | 38.4         | 1,312  | gy. oz.                     |
| 951        | Mar. 25 | 25 59 00                | 78 12 00 | 66           | 71            | 49.8         | 411    | gy. oz.                     |
| 952        | Mar. 25 | 26 04 00                | 78 29 00 | 69           | 74            | 51.8         | 383    | br. and gy. oz.             |
| 953        | Mar. 25 | 26 07 00                | 78 45 30 | 69           | 75            | 58.3         | 281    | wh. oz.                     |
| 954        | Apr. 3  | 24 14 00                | 81 30 00 | 72           | 73            | 46.3         | 145    | brk. sh.                    |
| 955        | Apr. 3  | 24 05 45                | 81 30 30 | 72           | 75            | 41.6         | 445    | wh. oz.                     |
| 956        | Apr. 4  | 23 58 30                | 81 31 00 | 72           | 75            | 40.5         | 589    | gy. s. yl. sp.              |
| 957        | Apr. 4  | 23 51 00                | 81 31 45 | 73           | 76            | 39.9         | 980    | gy. s. bk. sp.              |
| 958        | Apr. 4  | 23 43 00                | 81 32 15 | 73           | 76            | 39.6         | 777    | br. oz.                     |
| 959        | Apr. 4  | 23 35 30                | 81 32 45 | 74           | 76            | 39.6         | 815    | lt. br. oz.                 |
| 960        | Apr. 4  | 23 28 00                | 81 33 15 | 74           | 77            | 39.6         | 792    | lt. br. oz.                 |
| 961        | Apr. 4  | 23 20 30                | 81 33 45 | 73           | 77            | 40.6         | 707    | br. oz.                     |
| 962        | Apr. 4  | 23 13 00                | 81 34 30 | 76           | 77            | 50.0         | 398    | br. oz. sh.                 |
| 963        | Apr. 4  | 23 08 00                | 81 35 30 | 76           | 77            | 56.7         | 261    | br. s. sh.                  |
| 964        | Apr. 10 | 26 21 00                | 78 50 45 | 68           | 76            | 48.4         | 443    | wh. oz.                     |
| 965        | Apr. 10 | 26 27 00                | 78 38 00 | 70           | 74            | 60.6         | 290    | br. s. brk. sh.             |
| 966        | Apr. 10 | 26 25 30                | 78 27 50 | 70           | 73            | 40.7         | 528    | br. s.                      |
| 967        | Apr. 10 | 26 31 30                | 78 21 00 | 70           | 73            | 53.0         | 367    | yl. m.                      |
| 968        | Apr. 10 | 26 33 00                | 78 24 20 | 71           | 73            | 73.2         | 18     | co. s.                      |
| 969        | Apr. 10 | 26 32 30                | 78 24 00 | 71           | 73            | n. t.        | 148    | co. s.                      |
| 970        | Apr. 10 | 26 36 30                | 78 18 30 | 71           | 73            | 74.7         | 18     | co.                         |
| 971        | Apr. 10 | 26 38 30                | 78 14 00 | 71           | 74            | 62.3         | 274    | co. lt. br. oz.             |
| 972        | Apr. 10 | 26 39 00                | 78 09 00 | 72           | 74            | 67.2         | 157    | gy. oz.                     |
| 973        | Apr. 10 | 26 38 45                | 78 00 00 | 71           | 73            | n. t.        | 10     | gy. s. fne. sh.             |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                | Date.   | Position. |          | Temperature. |          |         | Depth. | Character of bottom.                                |
|---------------------------|---------|-----------|----------|--------------|----------|---------|--------|---|
|                           |         | Lat. N.   | Long. W. | Air.         | Surface. | Bottom. |        |   |
| Bahama Islands.           |         |           |          |              |          |         |        |   |
|                           | 1886.   | ° ' "     | ° ' "    | ° F.         | ° F.     | ° F.    | Fms.   |   |
| 974                       | Apr. 10 | 26 34 00  | 77 58 45 | 71           | 73       | 63.8    | 234    | gy. oz.   |
| 975                       | Apr. 10 | 26 22 00  | 78 08 00 | 70           | 73       | 39.6    | 867    | wh. oz.   |
| 976                       | Apr. 10 | 26 16 00  | 77 55 00 | 69           | 73       | 39.6    | 711    | br. oz.   |
| 977                       | Apr. 12 | 23 39 15  | 76 47 00 | 74           | 74       | 39.6    | 740    | wh. oz.   |
| 978                       | Apr. 12 | 23 44 00  | 77 00 00 | 73           | 74       | 40.2    | 756    | wh. oz.   |
| 979                       | Apr. 13 | 23 49 00  | 77 13 00 | 73           | 74       | 39.4    | 769    | wh. oz.   |
| 980                       | Apr. 13 | 23 50 00  | 77 25 30 | 73           | 73       | 39.6    | 740    | lt. br. oz.   |
| 981                       | Apr. 13 | 23 58 00  | 77 20 00 | 73           | 73       | 39.4    | 805    | lt. br. oz.   |
| 982                       | Apr. 13 | 23 57 00  | 77 12 15 | 73           | 73       | 40.4    | 514    | lt. br. oz.   |
| 983                       | Apr. 13 | 24 07 00  | 77 21 00 | 82           | 74       | 57.3    | 809    | wh. oz.   |
| 984                       | Apr. 13 | 24 13 00  | 77 30 30 | 78           | 74       | 39.4    | 822    | lt. br. oz.   |
| 985                       | Apr. 13 | 24 19 30  | 77 24 30 | 70           | 74       | 47.6    | 852    | lt. br. oz.   |
| 986                       | Apr. 13 | 24 25 00  | 77 18 15 | 74           | 74       | 59.8    | 639    | wh. m.  |
| 987                       | Apr. 14 | 24 29 30  | 77 19 00 | 72           | 73       | 45.7    | 444    | wh. m.  |
| 988                       | Apr. 14 | 24 37 00  | 77 30 00 | 80           | 73       | 39.1    | 939    | co. m.  |
| 989                       | Apr. 14 | 24 43 00  | 77 42 00 | 76           | 74       | 39.6    | 734    | lt. br. oz.   |
| 990                       | Apr. 14 | 25 19 30  | 77 57 30 | 71           | 73       | 38.6    | 959    | lt. br. oz.   |
| 991                       | Apr. 15 | 25 11 00  | 77 47 30 | 69           | 73       | 40.7    | 1,195  | lt. br. glcb. oz.                                   |
| 992                       | Apr. 15 | 25 02 30  | 77 40 00 | 74           | 73       | 39.8    | 1,084  | yl. m.  |
| 993                       | Apr. 17 | 25 06 00  | 77 32 00 | 72           | 73       | 39.4    | 794    | co. s.  |
| 994                       | Apr. 30 | 25 35 45  | 76 57 00 | 79           | 76       | 44.2    | 1,527  | lt. br. oz.   |
| 995                       | Apr. 30 | 25 39 30  | 76 53 45 | 79           | 76       | 36.9    | 1,922  | wh. co. oz.   |
| 996                       | Apr. 30 | 25 43 00  | 76 58 00 | 79           | 76       | 39.1    | 2,222  | br. oz.   |
| 997                       | Apr. 30 | 25 47 00  | 77 03 00 | 77           | 76       | 37.0    | 1,773  | gy. s. bk. sp.                                      |
| 998                       | Apr. 30 | 25 50 45  | 77 09 00 | 77           | 76       | -----   | 11½    | No specimen.  |
| 999                       | May 1   | 26 40 00  | 76 49 30 | 75           | 77       | 39.1    | 942    | brk. sh.  |
| 1000                      | May 1   | 26 43 00  | 76 38 30 | 75           | 77       | 36.8    | 2,800  | br. oz.   |
| 1001                      | May 1   | 26 45 00  | 76 26 00 | 77           | 76       | 38.1    | 2,764  | gy. co. s.  |
| 1002                      | May 1   | 26 47 00  | 76 15 00 | 76           | 74       | 38.4    | 2,693  | br. co. s.  |
| 1003                      | May 1   | 26 50 00  | 76 04 45 | 76           | 74       | 38.1    | 2,670  | br. oz.   |
| 1004                      | May 1   | 27 11 00  | 76 19 00 | 76           | 73       | 38.1    | 2,715  | co. s. for.   |
| 1005                      | May 2   | 27 41 00  | 76 41 00 | 69           | 72       | 38.6    | 943    | gy. oz. bk. sp.                                     |
| 1006                      | May 2   | 27 45 00  | 76 52 30 | 69           | 72       | 41.1    | 671    | yl. oz. bk. sp.                                     |
| 1007                      | May 2   | 27 49 00  | 77 04 00 | 69           | 72       | 41.1    | 690    | yl. oz. bk. sp.                                     |
| 1008                      | May 2   | 27 53 00  | 77 16 00 | 71           | 73       | 39.9    | 669    | yl. oz. bk. sp.                                     |
| 1009                      | May 2   | 27 49 30  | 77 35 00 | 72           | 73       | -----   | 661    | co. s. for.   |
| 1010                      | May 2   | 27 42 30  | 77 45 00 | 74           | 74       | 40.5    | 663    | lt. br. oz.   |
| 1011                      | May 2   | 27 35 45  | 77 51 00 | 74           | 74       | -----   | 632    | Wire parted, lost 400 turns, thermometer, and lead. |
| 1012                      | May 2   | 27 27 00  | 77 59 00 | 74           | 74       | 40.8    | 610    | wh. s.  |
| 1013                      | May 5   | 31 27 00  | 79 12 00 | 76           | 77       | 50.2    | 280    | crs. gy. s.   |
| New York to Newfoundland. |         |           |          |              |          |         |        |   |
| 1014                      | July 18 | 39 57 00  | 71 24 45 | 72           | 71       | 53.1    | 58     | br. s. sh.  |
| 1015                      | July 18 | 39 54 00  | 71 24 00 | 72           | 71       | 51.0    | 119    | gn. m.  |
| 1016                      | July 18 | 39 50 00  | 71 20 30 | 72           | 71       | 43.1    | 226    | gn. m.  |
| 1017                      | Aug. 3  | 40 14 00  | 65 56 00 | 68           | 75       | 36.7    | 2,224  | br. oz. c.  |
| 1018                      | Aug. 3  | 40 15 00  | 65 35 00 | 68           | 74       | 36.2    | 2,951  | br. oz.   |
| 1019                      | Aug. 4  | 40 20 00  | 64 54 00 | 68           | 73       | 37.3    | 2,575  | gy. and br. oz.                                     |
| 1020                      | Aug. 4  | 40 52 24  | 63 53 00 | 67           | 73       | -----   | 2,337  | lt. br. oz.   |
| 1021                      | Aug. 4  | 41 29 28  | 63 27 30 | 70           | 66       | 37.5    | 1,919  | lt. br. oz.   |
| 1022                      | Aug. 4  | 41 29 28  | 63 21 00 | 69           | 64       | 37.7    | 1,932  | lt. br. oz.   |
| 1023                      | Aug. 4  | 41 29 28  | 63 17 00 | 68           | 64       | 37.3    | 1,969  | lt. br. oz.   |
| 1024                      | Aug. 4  | 41 29 28  | 63 10 15 | 69           | 64       | 37.3    | 1,980  | lt. br. oz.   |
| 1025                      | Aug. 4  | 41 29 28  | 63 05 15 | 65           | 66       | -----   | 1,996  | lt. br. oz.   |
| 1026                      | Aug. 4  | 41 25 30  | 63 08 00 | 65           | 66       | 36.2    | 2,025  | lt. br. oz.   |
| 1027                      | Aug. 4  | 41 24 00  | 63 19 00 | 66           | 65       | 36.3    | 2,033  | lt. br. oz.   |
| 1028                      | Aug. 5  | 41 22 20  | 63 29 30 | 65           | 66       | 36.2    | 2,054  | lt. br. oz.   |
| 1029                      | Aug. 5  | 41 31 00  | 63 27 30 | 65           | 66       | 36.2    | 1,930  | lt. br. oz.   |
| 1030                      | Aug. 5  | 41 30 30  | 63 15 00 | 64           | 63       | 36.2    | 1,978  | lt. br. oz.   |
| 1031                      | Aug. 5  | 41 32 30  | 63 00 30 | 62           | 64       | 36.3    | 2,033  | lt. br. oz.   |
| 1032                      | Aug. 5  | 41 29 30  | 62 47 30 | 62           | 64       | 36.2    | 2,069  | lt. br. oz.   |
| 1033                      | Aug. 5  | 41 53 00  | 62 35 15 | 67           | 67       | -----   | 1,768  | No specimen.  |
| 1034                      | Aug. 5  | 42 21 00  | 62 18 00 | 69           | 66       | 38.2    | 1,138  | br. oz.   |
| 1035                      | Aug. 5  | 42 43 00  | 62 03 00 | 67           | 64       | 40.8    | 231    | gy. s. bk. sp.                                      |
| 1036                      | Aug. 6  | 43 30 00  | 57 40 00 | 64           | 62       | 37.2    | 1,731  | lt. br. oz.   |
| 1037                      | Aug. 7  | 43 45 00  | 56 09 00 | 62           | 62       | 37.2    | 1,758  | stk. br. m.   |
| 1038                      | Aug. 7  | 44 02 00  | 54 39 00 | 66           | 64       | 36.9    | 1,780  | lt. gy. m.  |
| 1039                      | Aug. 7  | 44 13 00  | 53 47 00 | 63           | 63       | 37.7    | 1,172  | br. oz.   |
| 1040                      | Aug. 8  | 44 23 00  | 52 42 00 | 61           | 62       | 31.9    | 81     | for. bk. sp.  |
| 1041                      | Aug. 8  | 44 52 00  | 50 25 24 | 62           | 62       | 39.7    | 34     | rd. s. bk. sp.                                      |
| 1042                      | Aug. 8  | 45 00 00  | 49 15 00 | 60           | 62       | 31.1    | 35     | wh. s. brk. sh.                                     |
| 1043                      | Aug. 8  | 45 00 00  | 49 09 00 | 60           | 62       | 31.0    | 35     | hrd.  |
| 1044                      | Aug. 8  | 45 00 00  | 49 03 00 | 57           | 59       | 30.9    | 35     | wh. s.  |
| 1045                      | Aug. 8  | 45 00 00  | 48 57 00 | 57           | 58       | 31.4    | 38     | p.  |
| 1046                      | Aug. 8  | 45 00 00  | 48 51 00 | 57           | 58       | 30.4    | 41     | p. wh. s. brk. sh.                                  |

## Record of hydrographic soundings of the Albatross, etc.— continued.

| Serial No.                         | Date.    | Position. |          | Temperature. |          |         | Depth. | Character of bottom.    |
|------------------------------------|----------|-----------|----------|--------------|----------|---------|--------|-------------------------|
|                                    |          | Lat. N.   | Long. W. | Air.         | Surface. | Bottom. |        |                         |
| New York to Newfoundland.          |          |           |          |              |          |         |        |                         |
| 1886.                              |          | ° ' "     | ° ' "    | ° F.         | ° F.     | ° F.    | Fms.   |                         |
| 1047                               | Aug. 8   | 45 00 30  | 48 45 00 | 57           | 56       | 31.9    | 115    | crs. wh. s. brk. sh.    |
| 1048                               | Aug. 8   | 45 02 00  | 48 20 00 | 57           | 56       | 37.8    | 1,169  | lt. br. oz.             |
| 1049                               | Aug. 9   | 45 02 00  | 47 08 00 | 62           | 59       | 38.2    | 1,916  | lt. br. oz.             |
| 1050                               | Aug. 9   | 45 02 00  | 45 58 00 | 65           | 62       | 36.3    | 1,981  | br. oz.                 |
| 1051                               | Aug. 9   | 45 04 00  | 44 38 00 | 65           | 63       | 36.2    | 2,549  | br. oz.                 |
| 1052                               | Aug. 10  | 45 06 00  | 43 23 30 | 67           | 68       | 36.8    | 2,621  | lt. br. oz.             |
| 1053                               | Aug. 10  | 45 14 00  | 42 03 00 | 69           | 70       | 37.8    | 2,658  | br. oz. for.            |
| 1054                               | Aug. 10  | 45 43 00  | 43 00 00 | 69           | 68       | 36.8    | 2,577  | lt. br. oz.             |
| 1055                               | Aug. 11  | 46 21 00  | 43 47 00 | 57           | 60       | 37.3    | 2,135  | s. g.                   |
| 1056                               | Aug. 11  | 47 02 30  | 45 06 30 | 59           | 58       | 38.2    | 103    | hrd.                    |
| 1057                               | Aug. 11  | 47 14 00  | 45 31 30 | 58           | 57       | 39.7    | 155    | wh. s. bk. sp.          |
| 1058                               | Aug. 12  | 47 27 00  | 46 11 30 | 56           | 57       | 38.7    | 423    | br. oz.                 |
| 1059                               | Aug. 12  | 47 32 12  | 46 53 30 | 53           | 49       | -----   | 477    | No specimen.            |
| 1060                               | Aug. 12  | 47 44 00  | 48 12 30 | 55           | 50       | 37.1    | 170    | gy. s. p.               |
| 1061                               | Aug. 12  | 47 46 00  | 48 19 30 | 55           | 51       | 36.5    | 168    | gy. s. bk. sp.          |
| 1062                               | Aug. 12  | 47 49 00  | 48 41 30 | 54           | 51       | 35.2    | 147    | gy. s. bk. sp. brk. sh. |
| 1063                               | Aug. 13  | 47 57 00  | 49 24 30 | 54           | 52       | 32.4    | 106    | gy. s. bk. sp.          |
| 1064                               | Aug. 13  | 48 02 00  | 50 10 30 | 55           | 53       | 30.4    | 100    | gy. m.                  |
| 1065                               | Aug. 13  | 47 31 00  | 50 17 00 | 56           | 54       | 30.1    | 62     | gy. s. bk. sp. p.       |
| 1066                               | Aug. 13  | 47 26 00  | 51 00 30 | 57           | 54       | -----   | 74     | fne. gy. s. bk. sp.     |
| 1067                               | Aug. 13  | 47 30 00  | 51 45 00 | 55           | 55       | -----   | 98     | gn. m.                  |
| 1068                               | Aug. 22  | 44 40 00  | 56 43 30 | 60           | 58       | 40.4    | 226    | gy. m.                  |
| 1069                               | Aug. 22  | 44 31 00  | 57 09 00 | 60           | 58       | 33.7    | 38     | gy. s. p.               |
| 1070                               | Aug. 23  | 44 25 00  | 57 35 00 | 63           | 59       | -----   | 32     | wh. s. bk. sp.          |
| 1071                               | Aug. 23  | 43 38 00  | 59 18 30 | 67           | 62       | 35.6    | 63     | gy. s. bk. sp.          |
| 1072                               | Aug. 25  | 41 37 00  | 62 58 00 | 63           | 65       | 36.9    | 1,943  | dk. br. oz.             |
| 1073                               | Aug. 25  | 41 37 00  | 63 05 00 | 63           | 68       | 36.7    | 1,854  | dk. br. oz.             |
| 1074                               | Aug. 25  | 41 37 00  | 63 11 30 | 63           | 65       | 37.2    | 1,798  | dk. br. oz.             |
| 1075                               | Aug. 25  | 41 37 00  | 63 18 00 | 64           | 65       | 37.1    | 1,779  | dk. br. oz.             |
| 1076                               | Aug. 25  | 41 37 00  | 63 26 00 | 70           | 73       | 36.9    | 1,762  | dk. br. oz.             |
| 1077                               | Aug. 25  | 41 37 00  | 63 34 00 | 70           | 73       | 36.9    | 1,741  | dk. br. oz.             |
| 1078                               | Aug. 25  | 41 42 00  | 63 34 00 | 70           | 72       | 37.2    | 1,644  | dk. br. oz.             |
| 1079                               | Aug. 25  | 41 42 00  | 63 27 00 | 70           | 72       | 36.9    | 1,693  | dk. br. oz.             |
| 1080                               | Aug. 25  | 41 42 00  | 63 21 00 | 70           | 72       | 36.9    | 1,697  | dk. br. oz.             |
| 1081                               | Aug. 25  | 41 42 00  | 63 14 30 | 70           | 71       | 37.5    | 1,713  | lt. br. oz. for.        |
| 1082                               | Aug. 26  | 41 49 00  | 63 50 00 | 73           | 73       | 37.5    | 1,587  | br. oz. gy. m.          |
| 1083                               | Aug. 26  | 41 42 00  | 63 47 30 | 74           | 73       | 37.2    | 1,620  | br. oz. for.            |
| 1084                               | Aug. 26  | 41 37 00  | 63 45 00 | 74           | 74       | 37.2    | 1,699  | br. oz. for.            |
| 1085                               | Aug. 26  | 41 32 00  | 63 43 00 | 74           | 74       | 36.7    | 1,805  | br. oz. for.            |
| 1086                               | Aug. 26  | 41 26 00  | 63 40 45 | 74           | 73       | 36.7    | 1,910  | br. oz. for.            |
| 1087                               | Aug. 26  | 41 27 00  | 63 51 30 | 70           | 73       | 36.7    | 1,880  | lt. br. oz.             |
| 1088                               | Aug. 27  | 41 27 00  | 64 22 30 | 67           | 72       | 36.7    | 1,879  | lt. br. oz. for.        |
| 1089                               | Aug. 27  | 41 23 00  | 64 51 30 | 68           | 72       | -----   | 1,696  | No specimen.            |
| Off Virginia.                      |          |           |          |              |          |         |        |                         |
| 1090                               | Sept. 17 | 37 37 00  | 74 11 00 | 64           | 70       | 39.5    | 352    | hrd.                    |
| 1091                               | Sept. 18 | 38 31 00  | 73 15 00 | 62           | 68       | 41      | 255    | gy. s.                  |
| Off Atlantic coast, South America. |          |           |          |              |          |         |        |                         |
| 1092                               | Dec. 6   | 9 47 00   | 55 51 00 | 85           | 82       | 36.5    | 2,069  | br. glob. oz.           |
| 1093                               | Dec. 8   | 6 25 00   | 50 29 30 | 82           | 80       | 37.5    | 2,406  | br. glob. oz.           |
| 1094                               | Dec. 9   | 5 01 00   | 46 44 00 | 80           | 80       | -----   | 1,876  | No specimen.            |
| 1095                               | Dec. 11  | 1 53 00   | 43 00 00 | 82           | 80       | -----   | 2,449  | glob. oz.               |
| Lat. S.                            |          |           |          |              |          |         |        |                         |
| 1096                               | Dec. 15  | 4 38 00   | 35 55 00 | 78           | 79       | 37.9    | 1,263  | co.                     |
| 1097                               | Dec. 17  | 10 10 00  | 35 32 00 | 81           | 79       | 37.9    | 1,276  | br. co.                 |
| 1098                               | Dec. 31  | 24 40 00  | 43 45 00 | 75           | 75       | 38.9    | 889    | br. glob. oz.           |
| 1099                               | Dec. 31  | 25 24 00  | 44 14 00 | 75           | 75       | 38.9    | 1,061  | Pter. oz.               |
| 1100                               | Dec. 31  | 25 45 00  | 44 38 00 | 78           | 75       | 38.9    | 1,099  | br. glob. oz.           |
| 1101                               | Dec. 31  | 25 51 00  | 44 48 00 | 78           | 75       | 38.9    | 1,019  | br. glob. oz.           |
| 1102                               | Dec. 31  | 25 41 00  | 44 48 00 | 78           | 76       | 38.4    | 945    | br. glob. oz.           |
| 1103                               | Dec. 31  | 25 42 00  | 44 58 30 | 78           | 76       | 37.9    | 777    | br. glob. oz.           |
| 1104                               | Dec. 31  | 26 23 00  | 45 31 30 | 77           | 76       | 37.9    | 756    | br. glob. oz.           |
| 1888.                              |          |           |          |              |          |         |        |                         |
| 1105                               | Jan. 2   | 31 05 00  | 49 45 00 | 82           | 76       | -----   | 78     | s. and brk. sh.         |
| 1106                               | Jan. 3   | 32 51 00  | 51 48 00 | 71           | 71       | -----   | 24     | s. and g.               |
| 1107                               | Jan. 3   | 33 17 00  | 52 19 00 | 72           | 71       | -----   | 11     | gy. s.                  |
| 1108                               | Jan. 3   | 33 46 10  | 52 45 00 | 72           | 70       | -----   | 14     | gy. s.                  |
| 1109                               | Jan. 3   | 33 55 00  | 52 53 00 | 70           | 70       | -----   | 14     | fne. dk. s.             |
| 1110                               | Jan. 3   | 34 01 00  | 53 00 00 | 68           | 70       | -----   | 11½    | fne. dk. s.             |
| 1111                               | Jan. 3   | 34 09 00  | 53 08 00 | 67           | 70       | -----   | 13     | fne. dk. s.             |
| 1112                               | Jan. 12  | 36 56 00  | 56 23 00 | 69           | 68       | -----   | 12     | s. brk. sh.             |
| Pacific coast, South America.      |          |           |          |              |          |         |        |                         |
| Lat. N.                            |          |           |          |              |          |         |        |                         |
| 1113                               | Mar. 31  | 6 44 00   | 80 27 00 | 77           | 77       | 35.9    | 1,927  | gn. m.                  |
| 1114                               | Apr. 1   | 5 16 00   | 83 09 00 | 80           | 79       | 36.9    | 1,729  | gn. m.                  |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                      | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|---------------------------------|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|                                 |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Pacific coast, South America.   |         |           |           |              |               |              |        |                      |
| 1888.                           |         |           |           |              |               |              |        |                      |
| 1115                            | Apr. 1  | 4 18 00   | 85 14 00  | 82           | 82            | 35.9         | 1,882  | dk. br. m. and for.  |
| 1116                            | Apr. 2  | 4 14 00   | 85 11 00  | 83           | 83            | 35.9         | 1,657  | dk. br. m. and for.  |
| 1117                            | Apr. 2  | 4 02 00   | 85 25 30  | 81           | 80            | 35.9         | 1,724  | gy. glob. oz.        |
| 1118                            | Apr. 2  | 2 53 00   | 86 24 00  | 84           | 83            | 35.9         | 1,616  | br. glob. oz.        |
| 1119                            | Apr. 3  | 1 13 00   | 88 02 00  | 80           | 80            | 35.9         | 1,341  | br. glob. oz.        |
| Lat. S.                         |         |           |           |              |               |              |        |                      |
| 1120                            | Apr. 7  | 1 08 00   | 89 39 00  | 80           | 78            | -----        | 287    | hrd.                 |
| 1121                            | Apr. 7  | 1 23 00   | 89 58 00  | 78           | 80            | 45.9         | 286    | gy. s. bk. sp.       |
| 1122                            | Apr. 8  | 1 25 00   | 90 07 00  | 80           | 79            | 53.9         | 191    | fne. gy. s.          |
| 1123                            | Apr. 13 | 00 53 00  | 90 15 30  | 81           | 79            | 58.1         | 108    | wh. s.               |
| 1124                            | Apr. 14 | 00 53 30  | 90 05 30  | 80           | 78            | 56.2         | 139    | wh. co. s.           |
| 1125                            | Apr. 14 | 00 51 00  | 89 43 30  | 79           | 78            | 45.6         | 329    | fne. gy. s.          |
| Lat. N.                         |         |           |           |              |               |              |        |                      |
| 1126                            | Apr. 17 | 4 44 00   | 93 02 00  | 83           | 83            | 35.9         | 1,976  | rd. br. oz.          |
| Off Central America and Mexico. |         |           |           |              |               |              |        |                      |
| 1127                            | Apr. 19 | 8 26 00   | 95 30 00  | 83           | 81            | 35.9         | 1,997  | gn. m.               |
| 1128                            | Apr. 20 | 11 45 00  | 97 03 00  | 84           | 84            | 35.9         | 2,256  | gn. m.               |
| 1129                            | Apr. 21 | 14 33 00  | 98 14 00  | 87           | 75            | 35.9         | 1,862  | gn. m.               |
| Off Alaska.                     |         |           |           |              |               |              |        |                      |
| 1130                            | July 19 | 52 15 00  | 156 37 00 | 51           | 51            | 34.9         | 2,550  | br. oz.              |
| 1131                            | July 19 | 52 12 00  | 158 20 00 | 51           | 49            | -----        | 2,581  | Wire carried away.   |
| 1132                            | July 19 | 52 15 00  | 160 00 00 | 50           | 48            | 35           | 2,558  | gy. oz. p.           |
| 1133                            | July 20 | 52 15 00  | 161 40 30 | 51           | 50            | -----        | 2,573  | Wire carried away.   |
| 1134                            | July 20 | 52 17 00  | 162 48 00 | 55           | 51            | 35.2         | 2,678  | gy. oz.              |
| 1135                            | July 20 | 52 18 00  | 163 54 00 | 54           | 50            | 35.2         | 2,848  | gy. oz.              |
| 1136                            | July 20 | 52 20 00  | 165 00 00 | 52           | 50            | 35.7         | 3,820  | gy. oz.              |
| 1137                            | July 21 | 52 20 00  | 166 05 00 | 55           | 50            | 35.2         | 2,654  | gy. oz.              |
| 1138                            | July 21 | 52 40 00  | 166 35 00 | 52           | 51            | 35.2         | 2,267  | gy. oz.              |
| 1139                            | July 21 | 52 53 00  | 166 44 00 | 52           | 50            | 35.2         | 1,961  | gy. oz.              |
| 1140                            | July 21 | 53 05 00  | 166 49 00 | 53           | 50            | 41.2         | 169    | bk. s.               |
| 1141                            | July 21 | 53 11 00  | 166 51 00 | 52           | 50            | 40.6         | 84     | bk. s. p.            |
| 1142                            | July 21 | 53 17 00  | 166 54 00 | 54           | 50            | -----        | 57     | s. bk. sp.           |
| 1143                            | July 21 | 53 22 00  | 166 55 30 | 54           | 50            | 42.7         | 41     | s. bk. sp.           |
| 1144                            | July 21 | 53 23 00  | 166 56 00 | 54           | 50            | 42.2         | 28     | s. bk. sp.           |
| 1145                            | July 21 | 53 19 00  | 166 50 00 | 51.5         | 48            | 41.7         | 55     | bk. s. p.            |
| 1146                            | July 21 | 53 17 00  | 166 42 00 | 51           | 48            | 41.2         | 58     | gy. s.               |
| 1147                            | July 21 | 53 15 00  | 166 35 00 | 51           | 48            | 41.2         | 83     | bk. s.               |
| 1148                            | July 21 | 53 13 00  | 166 27 00 | 51           | 49            | 41.2         | 174    | bk. s.               |
| 1149                            | July 21 | 53 16 00  | 166 10 00 | 51           | 49            | 39.5         | 228    | bk. s.               |
| 1150                            | July 22 | 53 25 00  | 166 02 30 | 51           | 49            | 41.2         | 94     | crs. bk. s.          |
| 1151                            | July 22 | 53 27 00  | 165 46 00 | 51           | 49            | 41.2         | 113    | crs. bk. s. p.       |
| 1152                            | July 22 | 53 30 00  | 165 30 00 | 51           | 49            | 39.7         | 261    | gr. m.               |
| 1153                            | July 22 | 53 37 00  | 165 18 36 | 50           | 48            | 40.7         | 99     | gy. s. p.            |
| 1154                            | July 22 | 53 39 00  | 165 04 00 | 50           | 48            | 41.2         | 133    | fne. gy. s.          |
| 1155                            | July 22 | 53 42 00  | 164 46 00 | 50           | 49            | 40.2         | 163    | bk. s.               |
| 1156                            | July 22 | 53 48 00  | 164 32 00 | 59           | 49            | 40.2         | 66     | bk. s. g.            |
| 1157                            | July 22 | 53 43 00  | 164 38 00 | 52           | 49            | 40.7         | 111    | bk. s. sh.           |
| 1158                            | July 22 | 53 43 00  | 164 31 00 | 52           | 50            | 40.7         | 73     | bk. s. fne. g.       |
| 1159                            | July 22 | 53 39 00  | 164 34 00 | 52           | 50            | 40.2         | 185    | lt. s.               |
| 1160                            | July 22 | 53 39 00  | 164 26 00 | 52           | 50            | 40.1         | 211    | gy. s. bk. sp.       |
| 1161                            | July 22 | 53 41 30  | 164 20 00 | 52           | 50            | 40.5         | 89     | bk. s.               |
| 1162                            | July 22 | 53 43 00  | 164 13 00 | 52           | 50            | 40.4         | 68     | gy. s. bk. sp. p.    |
| 1163                            | July 22 | 53 42 30  | 164 05 00 | 51           | 49            | 40.4         | 63     | gy. s. bk. sp.       |
| 1164                            | July 22 | 53 42 00  | 163 57 30 | 51           | 49            | 40.2         | 95     | gr. m.               |
| 1165                            | July 22 | 53 51 00  | 163 51 00 | 51           | 49            | 40.2         | 43     | bk. s.               |
| 1166                            | July 22 | 54 00 00  | 163 45 00 | 51           | 50            | 41.7         | 45     | fne. gy. s.          |
| 1167                            | July 22 | 54 09 00  | 163 41 00 | 51           | 50            | 41.2         | 45     | bk. s. bk. sp.       |
| 1168                            | July 22 | 54 13 00  | 164 02 00 | 51           | 49            | 39.2         | 51     | r. fne. g.           |
| 1169                            | July 23 | 54 16 00  | 164 23 00 | 52           | 49            | 41.2         | 56     | gy. s. bk. sp.       |
| 1170                            | July 23 | 54 18 00  | 164 38 00 | 52           | 50            | 42.2         | 45     | gy. s. bk. sp.       |
| 1171                            | July 23 | 54 20 00  | 164 49 00 | 51           | 48            | 43.9         | 30     | g.                   |
| 1172                            | July 23 | 54 22 00  | 165 00 00 | 51           | 48            | 45.2         | 42     | crs. bk. s. g.       |
| 1173                            | July 23 | 54 23 00  | 165 09 00 | 50           | 45            | 42.2         | 72     | crs. bk. s.          |
| 1174                            | July 23 | 54 25 00  | 165 19 00 | 50           | 45            | 40.7         | 80     | bk. s.               |
| 1175                            | July 23 | 54 24 00  | 165 25 00 | 50           | 45            | 40.2         | 85     | bk. s. g.            |
| 1176                            | July 23 | 54 22 00  | 165 34 30 | 48           | 44            | 40.7         | 73     | bk. s. g.            |
| 1177                            | July 23 | 54 21 00  | 165 41 00 | 51           | 45            | 41.2         | 51     | bk. s. g.            |
| 1178                            | July 23 | 54 19 00  | 165 49 00 | 51           | 45            | 41.2         | 53     | p.                   |
| 1179                            | July 28 | 53 56 00  | 166 07 00 | 48           | 49            | 44.4         | 36     | bk. s. brk. sh.      |
| 1180                            | July 28 | 53 56 00  | 165 48 00 | 52           | 46            | 43.2         | 51     | brk. sh. g.          |
| 1181                            | July 28 | 53 55 30  | 165 22 00 | 51           | 48            | 41.2         | 57     | bk. s.               |
| 1182                            | July 28 | 53 55 00  | 165 05 30 | 52           | 52            | 43.2         | 53     | bk. s. g.            |
| 1183                            | July 28 | 54 00 00  | 164 51 00 | 51           | 51            | 44.2         | 59     | brk. sh. p.          |
| 1184                            | July 28 | 53 58 00  | 164 39 00 | 49           | 50            | 41.2         | 61     | gy. s. g.            |
| 1185                            | July 28 | 53 55 00  | 164 22 00 | 50           | 50            | 40.2         | 50     | crs. bk. s.          |
| 1186                            | July 29 | 53 53 00  | 164 05 00 | 51           | 50            | 41.2         | 45     | gy. s.               |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.          |           | Temperature. |               |              | Depth.      | Character of bottom. |
|------------|---------|--------------------|-----------|--------------|---------------|--------------|-------------|----------------------|
|            |         | Lat. N.            | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |             |                      |
|            |         | <i>Off Alaska.</i> |           |              |               |              |             |                      |
|            | 1888.   | ° ' "              | ° ' "     | ° F.         | ° F.          | ° F.         | <i>Fms.</i> |                      |
| 1187       | July 29 | 53 49 00           | 163 40 00 | 51           | 50            | 39.2         | 342         | bk. s.               |
| 1188       | July 29 | 54 00 00           | 163 37 00 | 52           | 51            | 41.2         | 62          | bk. s.               |
| 1189       | July 29 | 54 01 00           | 163 45 00 | 52           | 51            | 40.2         | 49          | bk. s.               |
| 1190       | July 29 | 54 02 00           | 163 53 30 | 52           | 51            | 41.7         | 48          | bk. s.               |
| 1191       | July 29 | 54 04 00           | 164 01 00 | 52           | 51            | 42.2         | 46          | bk. s.               |
| 1192       | July 29 | 54 06 00           | 164 17 00 | 53           | 51            | 43.2         | 41          | bk. s. g.            |
| 1193       | July 29 | 54 08 00           | 164 25 00 | 53           | 51            | 42.2         | 52          | bk. s.               |
| 1194       | July 29 | 54 09 00           | 164 33 00 | 52           | 50            | 41.2         | 52          | bk. s. g.            |
| 1195       | July 29 | 54 10 00           | 164 42 00 | 51           | 50            | 41.2         | 49          | brk. sh.             |
| 1196       | July 29 | 54 11 00           | 164 48 00 | 51           | 50            | 43.2         | 52          | rky.                 |
| 1197       | July 29 | 54 15 00           | 164 41 00 | 50           | 51            | 40.7         | 71          | crs. bk. s.          |
| 1198       | July 29 | 54 25 00           | 164 21 00 | 52           | 51            | 40.6         | 63          | r. bk. s.            |
| 1199       | July 29 | 54 22 00           | 164 01 00 | 51           | 49            | 41.2         | 55          | bk. s.               |
| 1200       | July 29 | 54 20 00           | 163 41 00 | 51           | 49            | 40.2         | 72          | bk. s.               |
| 1201       | July 29 | 54 18 00           | 163 21 00 | 51           | 50            | 40.2         | 44          | bk. s. g.            |
| 1202       | July 29 | 54 18 00           | 163 18 00 | 51           | 50            | 42.2         | 32          | rky.                 |
| 1202a      | July 29 | 54 16 00           | 163 19 30 | 51           | 50            | -----        | 28          | No specimen.         |
| 1202b      | July 29 | 54 15 00           | 163 21 00 | 51           | 50            | -----        | 25          | No specimen.         |
| 1203       | July 30 | 54 14 00           | 163 21 30 | 51           | 50            | 40.2         | 39          | gy. s. bk. sp.       |
| 1204       | July 30 | 54 10 00           | 163 24 00 | 51           | 51            | 42.3         | 42          | gy. s. bk. sp.       |
| 1205       | July 30 | 54 09 00           | 163 14 00 | 50           | 50            | 42.2         | 44          | bk. s. g.            |
| 1206       | July 30 | 54 09 00           | 163 04 00 | 51           | 50            | 42.2         | 43          | g.                   |
| 1207       | July 30 | 54 09 00           | 162 58 00 | 51           | 50            | -----        | 43          | bk. s.               |
| 1208       | July 30 | 54 08 00           | 162 54 00 | 51           | 50            | 42.2         | 41          | gy. s. bk. sp.       |
| 1209       | July 30 | 54 03 00           | 162 43 00 | 51           | 50            | 41.2         | 51          | g.                   |
| 1210       | July 30 | 53 58 00           | 162 42 00 | 51           | 50            | 42.2         | 464         | rky.                 |
| 1211       | July 30 | 54 03 00           | 162 33 00 | 51           | 50            | 39.2         | 265         | rky.                 |
| 1212       | July 30 | 54 08 00           | 162 22 00 | 51           | 50            | 40.2         | 60          | crs. s. p.           |
| 1213       | July 30 | 54 12 00           | 162 17 00 | 51           | 50            | 42.2         | 47          | bk. s. fne. g.       |
| 1214       | July 30 | 54 09 00           | 162 10 00 | 51           | 51            | 40.2         | 67          | rky.                 |
| 1215       | July 30 | 54 12 00           | 162 02 00 | 51           | 50            | 41.2         | 51          | rky. fne. g.         |
| 1216       | July 30 | 54 16 00           | 161 53 00 | 51           | 50            | 42.2         | 37          | rky.                 |
| 1217       | July 30 | 54 20 00           | 161 46 00 | 51           | 50            | 40.7         | 38          | p.                   |
| 1218       | July 30 | 54 26 00           | 161 45 00 | 52           | 50            | 39.8         | 80          | gr. m.               |
| 1219       | July 30 | 54 31 00           | 161 44 00 | 52           | 50            | 40.2         | 82          | gr. m.               |
| 1220       | July 30 | 54 34 00           | 161 48 00 | 52           | 50            | 41.2         | 58          | rky.                 |
| 1221       | July 30 | 54 27 00           | 161 53 00 | 51           | 49            | 40.2         | 81          | gr. m.               |
| 1222       | July 30 | 54 32 00           | 161 39 00 | 51           | 49            | 40.2         | 81          | rky.                 |
| 1223       | July 30 | 54 37 00           | 161 27 00 | 51           | 49            | 41.7         | 59          | bk. s.               |
| 1224       | July 31 | 54 42 00           | 161 13 00 | 51           | 49            | 42.2         | 64          | bk. s.               |
| 1225       | July 31 | 54 47 00           | 161 00 00 | 51           | 49            | 42.2         | 47          | bk. s. g.            |
| 1226       | July 31 | 54 51 00           | 160 47 00 | 51           | 49            | -----        | 45          | gy. s. p.            |
| 1227       | July 31 | 54 56 00           | 160 33 00 | 51           | 50            | 41.8         | 52          | gy. s.               |
| 1228       | July 31 | 54 59 00           | 160 26 00 | 51           | 51            | 41.7         | 60          | gy. s.               |
| 1229       | Aug. 2  | 55 08 00           | 160 05 00 | 51           | 49            | 40.9         | 18          | fne. gy. s.          |
| 1230       | Aug. 3  | 55 04 00           | 160 26 00 | 58           | 51            | 45.7         | 34          | brk. sh.             |
| 1231       | Aug. 3  | 55 05 00           | 160 42 00 | 54           | 51            | 44.2         | 38          | rky.                 |
| 1232       | Aug. 3  | 55 00 00           | 160 56 00 | 53           | 52            | 40.2         | 71          | dk. m.               |
| 1233       | Aug. 3  | 54 52 00           | 161 17 00 | 54           | 51            | 41.7         | 74          | dk. m.               |
| 1234       | Aug. 3  | 54 47 00           | 161 26 00 | 54           | 51            | 43.2         | 41          | rky.                 |
| 1235       | Aug. 3  | 54 44 00           | 161 27 00 | 52           | 51            | -----        | 45          | rky.                 |
| 1236       | Aug. 3  | 54 38 00           | 161 39 00 | 52           | 51            | 43.2         | 49          | bk. s. g.            |
| 1237       | Aug. 3  | 54 32 00           | 161 53 00 | 52           | 51            | 41.2         | 75          | bk. s.               |
| 1238       | Aug. 3  | 54 25 00           | 162 05 00 | 52           | 51            | 40.2         | 63          | bk. s.               |
| 1239       | Aug. 3  | 54 23 00           | 161 56 00 | 51           | 51            | 43.5         | 34          | p.                   |
| 1240       | Aug. 3  | 54 20 00           | 162 02 00 | 51           | 50            | 43           | 30          | sh.                  |
| 1241       | Aug. 3  | 54 16 00           | 162 08 00 | 52           | 50            | 42.2         | 40          | brk. sh. g.          |
| 1242       | Aug. 3  | 54 07 00           | 162 07 00 | 51           | 50            | 38.2         | 435         | dk. m.               |
| 1243       | Aug. 3  | 54 10 00           | 161 54 00 | 52           | 50            | 39.7         | 52          | rky.                 |
| 1244       | Aug. 3  | 54 13 00           | 161 47 00 | 52           | 51            | 40.2         | 50          | bk. s. p.            |
| 1245       | Aug. 3  | 54 17 00           | 161 40 00 | 52           | 51            | 41.7         | 44          | crs. s.              |
| 1246       | Aug. 3  | 54 18 00           | 161 34 00 | 52           | 51            | 42.2         | 42          | s. r.                |
| 1247       | Aug. 4  | 54 22 00           | 161 22 00 | 52           | 51            | 41.2         | 61          | r. g.                |
| 1248       | Aug. 4  | 54 27 00           | 161 08 00 | 52           | 50            | 41.2         | 59          | bk. s.               |
| 1249       | Aug. 4  | 54 31 00           | 160 54 00 | 52           | 50            | 40.2         | 71          | bk. s.               |
| 1250       | Aug. 4  | 54 35 00           | 160 41 00 | 52           | 51            | 40.2         | 72          | bu. m.               |
| 1251       | Aug. 4  | 54 39 00           | 160 28 00 | 52           | 50            | 40.4         | 62          | gy. s. p.            |
| 1252       | Aug. 4  | 54 43 00           | 160 14 00 | 53           | 51            | 40.6         | 50          | fne. gy. s.          |
| 1253       | Aug. 4  | 54 47 00           | 160 00 00 | 53           | 51            | 42.2         | 43          | gy. s. bk. sp.       |
| 1254       | Aug. 4  | 54 49 00           | 159 54 00 | 53           | 51            | 43.7         | 40          | fne. gy. s.          |
| 1255       | Aug. 4  | 54 57 00           | 159 55 00 | 51           | 50            | 48.3         | 25          | gy. s.               |
| 1256       | Aug. 4  | 55 00 00           | 159 54 00 | 51           | 50            | 45.2         | 27          | rky.                 |
| 1257       | Aug. 4  | 54 59 00           | 159 45 00 | 51           | 50            | 45.2         | 26          | bk. s. p.            |
| 1258       | Aug. 4  | 55 02 00           | 159 41 00 | 53           | 50            | 44.7         | 37          | gy. s. brk. sh.      |
| 1259       | Aug. 4  | 55 06 00           | 159 39 00 | 53           | 48            | 44.2         | 57          | s. brk. sh.          |
| 1260       | Aug. 4  | 55 10 00           | 159 40 00 | 53           | 48            | 44.2         | 39          | s. brk. sh.          |
| 1261       | Aug. 4  | 55 15 00           | 159 28 00 | 53           | 48            | 42.0         | 23          | r. c.                |
| 1262       | Aug. 5  | 55 03 00           | 159 15 00 | 51           | 49            | 45.7         | 27          | brk. sh.             |
| 1263       | Aug. 5  | 55 01 00           | 159 08 00 | 51           | 49            | 43.2         | 44          | g.                   |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.  | Position.   |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|--------|-------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |        | Lat. N.     | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |        | Off Alaska. |           |              |               |              |        |                      |
|            | 1888.  | ° ' "       | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1264       | Aug. 5 | 54 59 00    | 159 00 00 | 51           | 49            | 42.2         | 48     | gy. s.               |
| 1265       | Aug. 5 | 54 57 00    | 158 52 00 | 51           | 49            | 42.2         | 43     | gy. s. g.            |
| 1266       | Aug. 5 | 54 55 00    | 158 46 00 | 51           | 49            | 42.2         | 46     | gy. s. brk. sh.      |
| 1267       | Aug. 5 | 54 53 00    | 158 38 00 | 52           | 51            | 40.2         | 70     | gy. s.               |
| 1268       | Aug. 5 | 54 49 00    | 158 42 00 | 51           | 51            | 40.9         | 56     | gy. s. p.            |
| 1269       | Aug. 5 | 54 51 00    | 158 49 00 | 51           | 51            | 42.2         | 46     | gy. s. brk. sh.      |
| 1270       | Aug. 5 | 54 52 00    | 158 54 00 | 51           | 51            | -----        | 45     | rky.                 |
| 1271       | Aug. 5 | 54 53 00    | 158 57 00 | 51           | 51            | 42.7         | 41     | s. r.                |
| 1272       | Aug. 5 | 54 54 00    | 159 01 00 | 51           | 52            | -----        | 45     | rky.                 |
| 1273       | Aug. 5 | 54 55 00    | 159 05 00 | 52           | 52            | 43.2         | 35     | rky.                 |
| 1274       | Aug. 5 | 54 52 00    | 159 07 00 | 52           | 52            | -----        | 38     | gy. s. p. brk. sh.   |
| 1275       | Aug. 5 | 54 50 00    | 159 08 30 | 52           | 52            | 44.2         | 35     | rky.                 |
| 1276       | Aug. 5 | 54 49 00    | 159 05 00 | 52           | 52            | -----        | 57     | rky.                 |
| 1277       | Aug. 5 | 54 48 00    | 159 01 00 | 52           | 52            | 43.2         | 44     | sh. fine g.          |
| 1278       | Aug. 5 | 54 47 00    | 158 55 00 | 54           | 51            | 42.2         | 47     | r. sh.               |
| 1279       | Aug. 5 | 54 46 00    | 158 53 00 | 54           | 51            | 42.5         | 49     | r.                   |
| 1280       | Aug. 5 | 54 44 00    | 158 44 00 | 54           | 51            | 41.7         | 55     | rky.                 |
| 1281       | Aug. 5 | 54 35 00    | 158 51 00 | 54           | 51            | 40.7         | 99     | bu. m. p.            |
| 1282       | Aug. 5 | 54 37 00    | 158 58 00 | 54           | 51            | 40.2         | 69     | gy. s. p.            |
| 1283       | Aug. 5 | 54 38 00    | 159 02 00 | 53           | 51            | 41.3         | 56     | gy. s. p.            |
| 1284       | Aug. 5 | 54 39 00    | 159 09 00 | 53           | 51            | 42.5         | 46     | p.                   |
| 1285       | Aug. 5 | 54 41 00    | 159 16 00 | 53           | 51            | 43.2         | 41     | gy. s. sh.           |
| 1286       | Aug. 5 | 54 42 00    | 159 24 00 | 51           | 49            | 44.2         | 35     | rky.                 |
| 1287       | Aug. 5 | 54 41 00    | 159 29 30 | 51           | 49            | 44.2         | 35     | rky.                 |
| 1288       | Aug. 5 | 54 37 00    | 159 25 00 | 51           | 49            | -----        | 43     | rky.                 |
| 1289       | Aug. 5 | 54 32 00    | 159 17 00 | 51           | 51            | -----        | 115    | rky.                 |
| 1290       | Aug. 5 | 54 25 00    | 159 40 00 | 50           | 50            | 41.2         | 105    | bk. s.               |
| 1291       | Aug. 6 | 54 36 00    | 159 39 00 | 50           | 51            | 42.4         | 49     | bk. s.               |
| 1292       | Aug. 6 | 54 41 00    | 159 39 00 | 50           | 51            | 43.0         | 42     | p.                   |
| 1293       | Aug. 6 | 54 42 00    | 159 47 00 | 50           | 51            | 43.2         | 44     | r.                   |
| 1294       | Aug. 6 | 54 37 00    | 159 52 00 | 50           | 51            | 42.2         | 49     | r. gy. s.            |
| 1295       | Aug. 6 | 54 28 00    | 160 00 00 | 50           | 51            | 40.6         | 67     | p.                   |
| 1296       | Aug. 6 | 54 25 00    | 160 03 00 | 50           | 51            | 41.2         | 119    | fine gy. s.          |
| 1297       | Aug. 6 | 54 39 00    | 158 43 00 | 58           | 51            | 41.2         | 52     | rky.                 |
| 1298       | Aug. 6 | 54 40 00    | 158 35 00 | 55           | 51            | 40.7         | 57     | rky.                 |
| 1299       | Aug. 6 | 54 41 00    | 158 25 00 | 54           | 53            | 41.2         | 86     | p.                   |
| 1300       | Aug. 6 | 54 46 00    | 158 22 00 | 54           | 53            | 41.2         | 110    | gy. s.               |
| 1301       | Aug. 6 | 54 50 00    | 158 30 00 | 54           | 53            | 41.2         | 87     | gy. s.               |
| 1302       | Aug. 6 | 54 56 00    | 158 30 00 | 55           | 53            | 40.4         | 90     | g.                   |
| 1303       | Aug. 6 | 55 01 00    | 158 30 00 | 53           | 53            | 40.6         | 114    | gr. m.               |
| 1304       | Aug. 6 | 55 03 00    | 158 38 00 | 53           | 52            | 39.9         | 87     | g.                   |
| 1305       | Aug. 6 | 55 04 00    | 158 48 00 | 53           | 52            | 40.4         | 79     | gy. s.               |
| 1306       | Aug. 6 | 55 07 00    | 158 55 00 | 51           | 50            | 41.5         | 50     | gy. s.               |
| 1307       | Aug. 6 | 55 09 00    | 159 03 00 | 51           | 50            | 41.9         | 47     | gy. s. p.            |
| 1308       | Aug. 6 | 55 11 00    | 159 11 00 | 52           | 51            | 43.2         | 53     | gy. s.               |
| 1309       | Aug. 6 | 55 13 00    | 159 18 00 | 51           | 51            | 42.2         | 58     | gy. s.               |
| 1310       | Aug. 6 | 55 17 00    | 159 19 00 | 51           | 51            | 40.4         | 102    | bu. m.               |
| 1311       | Aug. 6 | 55 18 00    | 159 02 00 | 51           | 51            | 40.2         | 103    | bm. m.               |
| 1312       | Aug. 7 | 55 20 00    | 158 45 00 | 51           | 51            | 41.2         | 97     | gy. s.               |
| 1313       | Aug. 7 | 55 21 00    | 158 29 00 | 50           | 52            | 40.2         | 80     | gy. s.               |
| 1314       | Aug. 7 | 55 22 00    | 158 12 00 | 50           | 52            | -----        | 68     | m.                   |
| 1315       | Aug. 7 | 55 23 00    | 157 55 00 | 50           | 50            | 42.1         | 56     | g. brk. sh.          |
| 1316       | Aug. 7 | 55 25 00    | 157 37 00 | 51           | 50            | 42.0         | 46     | yl. s.               |
| 1317       | Aug. 7 | 55 26 00    | 157 28 00 | 51           | 50            | 42.1         | 47     | gn. m.               |
| 1318       | Aug. 7 | 55 30 00    | 157 44 00 | 50           | 50            | 41.9         | 53     | gy. s. g.            |
| 1319       | Aug. 7 | 55 34 00    | 158 00 00 | 51           | 51            | 40.1         | 73     | fine gy. s.          |
| 1320       | Aug. 7 | 55 39 00    | 158 14 00 | 51           | 51            | 42.1         | 73     | m. fine gy. s.       |
| 1321       | Aug. 7 | 55 47 00    | 158 27 00 | 51           | 51            | 41.9         | 64     | fine gy. s.          |
| 1322       | Aug. 7 | 55 54 00    | 158 40 00 | 53           | 51            | 43.1         | 68     | bu. m.               |
| 1323       | Aug. 7 | 55 57 00    | 158 47 00 | 53           | 52            | 42.1         | 82     | bu. m.               |
| 1324       | Aug. 8 | 55 52 00    | 158 29 00 | 52           | 50            | 42.1         | 67     | fine gy. s.          |
| 1325       | Aug. 8 | 55 49 00    | 158 12 00 | 53           | 51            | 43.3         | 44     | sh. g.               |
| 1326       | Aug. 8 | 55 47 00    | 157 55 00 | 53           | 51            | 44.3         | 57     | gy. s.               |
| 1327       | Aug. 8 | 55 45 00    | 157 39 00 | 54           | 53            | 41.3         | 67     | fine bk. s.          |
| 1328       | Aug. 8 | 55 44 00    | 157 30 00 | 54           | 53            | 41.5         | 59     | br. s.               |
| 1329       | Aug. 8 | 55 42 00    | 157 24 00 | 54           | 53            | -----        | 54     | rky.                 |
| 1330       | Aug. 8 | 55 41 00    | 157 24 00 | 54           | 53            | -----        | 49     | br. s. g.            |
| 1331       | Aug. 8 | 55 40 00    | 157 16 00 | 56           | 52            | 43.9         | 48     | bk. s. g.            |
| 1332       | Aug. 8 | 55 39 00    | 157 07 00 | 56           | 52            | 45.1         | 47     | crs. gy. s.          |
| 1333       | Aug. 8 | 55 37 00    | 156 57 00 | 54           | 51            | 42.9         | 50     | gy. s.               |
| 1334       | Aug. 8 | 55 36 00    | 156 47 00 | 53           | 52            | 41.7         | 55     | fine gy. s.          |
| 1335       | Aug. 8 | 55 34 00    | 156 30 00 | 53           | 52            | 41.1         | 135    | gn. m.               |
| 1336       | Aug. 8 | 55 44 00    | 156 19 00 | 54           | 52            | 41.1         | 137    | bu. m.               |
| 1337       | Aug. 8 | 55 53 00    | 156 06 00 | 54           | 52            | 41.3         | 119    | bu. m.               |
| 1338       | Aug. 9 | 55 46 00    | 155 55 00 | 53           | 50            | 41.1         | 89     | p.                   |
| 1339       | Aug. 9 | 55 39 00    | 155 44 00 | 52           | 50            | 42.6         | 60     | rky.                 |
| 1340       | Aug. 9 | 55 32 00    | 155 32 00 | 52           | 50            | 42.1         | 96     | gy. sp.              |
| 1341       | Aug. 9 | 55 39 00    | 155 27 00 | 52           | 50            | 46.1         | 57     | gy. s.               |
| 1342       | Aug. 9 | 55 47 00    | 155 22 00 | 52           | 50            | 48.2         | 26     | gy. s.               |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.   |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|-------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.     | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Off Alaska. |           |              |               |              |        |                      |
|            | 1888.   | ° ' "       | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1343       | Aug. 9  | 55 49 00    | 155 20 00 | 52           | 50            | 48.0         | 27     | gy. s. brk. sp.      |
| 1344       | Aug. 9  | 55 44 00    | 155 14 00 | 50           | 48            | 41.9         | 76     | gy. s.               |
| 1345       | Aug. 9  | 55 39 00    | 155 09 00 | 50           | 48            | 38.9         | 287    | gy. s.               |
| 1346       | Aug. 9  | 55 47 00    | 155 00 00 | 52           | 52            | 41.6         | 89     | gy. s.               |
| 1347       | Aug. 9  | 55 55 00    | 154 51 00 | 55           | 54            | 41.3         | 81     | fne. br. s.          |
| 1348       | Aug. 9  | 55 59 00    | 154 47 00 | 58           | 54            | 42.5         | 76     | fne. gy. s.          |
| 1349       | Aug. 9  | 56 04 00    | 154 44 00 | 58           | 54            | 41.5         | 60     | fne. gy. s.          |
| 1350       | Aug. 9  | 56 07 00    | 154 38 00 | 58           | 54            | 42.5         | 37     | gy. s.               |
| 1351       | Aug. 9  | 56 05 00    | 154 33 00 | 55           | 55            | 41.6         | 61     | fne. gy. s.          |
| 1352       | Aug. 9  | 56 03 00    | 154 25 00 | 55           | 55            | 41.6         | 66     | gy. s. p. co.        |
| 1353       | Aug. 9  | 56 09 00    | 154 15 00 | 55           | 53            | 41.9         | 75     | bk. s.               |
| 1354       | Aug. 9  | 56 18 00    | 154 10 00 | 54           | 53            | 43.1         | 54     | gy. s. bk. sp.       |
| 1355       | Aug. 9  | 56 28 00    | 154 05 00 | 53           | 50            | 43.2         | 28     | gy. s.               |
| 1356       | Aug. 9  | 56 27 00    | 153 55 00 | 53           | 52            | 48           | 23     | brk. sh.             |
| 1357       | Aug. 9  | 56 24 00    | 153 47 00 | 53           | 52            | 43.1         | 52     | bn. s.               |
| 1358       | Aug. 9  | 56 18 00    | 153 33 00 | 53           | 52            | 43.2         | 46     | g.                   |
| 1359       | Aug. 9  | 56 15 00    | 153 25 00 | 54           | 53            | 41.4         | 52     | gy. s. p.            |
| 1360       | Aug. 9  | 56 12 00    | 153 18 00 | 54           | 53            | 41.5         | 88     | fne. gy. s.          |
| 1361       | Aug. 9  | 56 23 00    | 153 24 00 | 54           | 52            | 44.5         | 36     | sh.                  |
| 1362       | Aug. 10 | 56 28 00    | 153 26 00 | 53           | 51            | 44.1         | 45     | gy. s. sh.           |
| 1363       | Aug. 10 | 56 34 00    | 153 29 00 | 52           | 51            | 41.1         | 73     | bu. m.               |
| 1364       | Aug. 10 | 56 35 00    | 153 19 00 | 54           | 53            | 42.1         | 53     | gy. s. c.            |
| 1365       | Aug. 10 | 56 36 00    | 153 10 00 | 54           | 51            | 42.6         | 58     | bu. m.               |
| 1366       | Aug. 10 | 56 37 00    | 153 00 00 | 53           | 51            | 42.1         | 49     | bu. m.               |
| 1367       | Aug. 10 | 56 39 00    | 152 50 00 | 53           | 51            | 42.1         | 44     | rky.                 |
| 1368       | Aug. 10 | 56 40 00    | 152 40 00 | 53           | 51            | 42.6         | 51     | gy. s.               |
| 1369       | Aug. 10 | 56 41 00    | 152 30 00 | 53           | 51            | 42.1         | 49     | rky.                 |
| 1370       | Aug. 10 | 56 42 00    | 152 21 00 | 54           | 52            | 43.3         | 37     | s. p.                |
| 1371       | Aug. 10 | 56 46 00    | 152 35 00 | 66           | 54            | 41.9         | 61     | s. p.                |
| 1372       | Aug. 10 | 56 51 00    | 152 50 00 | 66           | 54            | 44.7         | 37     | gy. s. brk. sh.      |
| 1373       | Aug. 10 | 56 58 00    | 153 10 00 | 57           | 55            | 47.3         | 18     | brk. sh.             |
| 1374       | Aug. 10 | 57 04 00    | 153 18 00 | 57           | 55            | 43.2         | 68     | bk. m.               |
| 1375       | Aug. 10 | 57 07 00    | 153 18 00 | 57           | 55            | 44.1         | 57     | br. m.               |
| 1376       | Aug. 12 | 56 55 00    | 153 19 00 | 54           | 53            | 43.8         | 71     | fne. gy. s.          |
| 1377       | Aug. 12 | 56 51 00    | 153 13 00 | 54           | 55            | 39.9         | 111    | gn. m.               |
| 1378       | Aug. 12 | 56 43 00    | 153 00 00 | 53           | 54            | 40.9         | 60     | rky.                 |
| 1379       | Aug. 12 | 56 35 00    | 152 48 00 | 53           | 54            | 41.9         | 46     | s. p.                |
| 1380       | Aug. 12 | 56 28 00    | 152 36 00 | 52           | 53            | 42.6         | 38     | p.                   |
| 1381       | Aug. 12 | 56 20 00    | 152 23 00 | 52           | 54            | 39.1         | 347    | gn. m.               |
| 1382       | Aug. 12 | 56 29 00    | 152 11 00 | 52           | 54            | 40.1         | 173    | gy. s.               |
| 1383       | Aug. 13 | 56 38 00    | 151 59 00 | 53           | 54            | 44.6         | 28     | rky.                 |
| 1384       | Aug. 13 | 56 35 00    | 151 50 00 | 53           | 54            | 42.1         | 60     | gy. s. r.            |
| 1385       | Aug. 13 | 56 33 00    | 151 42 00 | 53           | 54            | 39.6         | 298    | gy. s.               |
| 1386       | Aug. 13 | 56 42 00    | 151 29 00 | 53           | 54            | 39.1         | 485    | rky.                 |
| 1387       | Aug. 13 | 56 49 00    | 151 42 00 | 53           | 54            | 42.9         | 58     | gy. s.               |
| 1388       | Aug. 13 | 56 56 00    | 151 56 00 | 53           | 53            | 44.8         | 49     | gy. s.               |
| 1389       | Aug. 13 | 57 03 00    | 152 10 00 | 53           | 52            | 43.9         | 44     | rky.                 |
| 1390       | Aug. 13 | 57 10 00    | 152 23 00 | 54           | 52            | 41.4         | 86     | fne. gy. s.          |
| 1391       | Aug. 13 | 57 12 00    | 152 27 00 | 55           | 53            | 44.4         | 53     | fne. gy. s.          |
| 1392       | Aug. 13 | 57 16 00    | 152 22 00 | 55           | 50            | 45.3         | 39     | bn. s. g.            |
| 1393       | Aug. 13 | 57 20 00    | 152 15 00 | 57           | 52            | 47.5         | 25     | rky.                 |
| 1394       | Aug. 13 | 57 17 00    | 152 07 00 | 52           | 49            | 44.6         | 45     | brk. sh.             |
| 1395       | Aug. 13 | 57 11 00    | 151 52 00 | 52           | 49            | 45.1         | 43     | gy. s. brk. sh.      |
| 1396       | Aug. 13 | 57 05 00    | 151 37 00 | 52           | 53            | 45.1         | 46     | co.                  |
| 1397       | Aug. 13 | 57 00 00    | 151 23 00 | 56           | 53            | 41.4         | 90     | gy. s.               |
| 1398       | Aug. 13 | 57 11 00    | 151 05 00 | 55           | 53            | 41.8         | 75     | gy. s.               |
| 1399       | Aug. 13 | 57 18 00    | 151 19 00 | 53           | 53            | 43.4         | 71     | g.                   |
| 1400       | Aug. 13 | 57 24 00    | 151 33 00 | 52           | 50            | 45.5         | 39     | rky.                 |
| 1401       | Aug. 13 | 57 30 00    | 151 46 00 | 52           | 50            | 44.9         | 57     | rky.                 |
| 1402       | Aug. 13 | 57 35 00    | 151 52 00 | 52           | 50            | 42.9         | 81     | rky.                 |
| 1403       | Aug. 21 | 57 43 00    | 152 14 00 | 60           | 54            | 46.5         | 69     | bu. m.               |
| 1404       | Aug. 21 | 57 42 00    | 152 09 00 | 60           | 54            | -----        | 17     | rky.                 |
| 1405       | Aug. 21 | 57 46 00    | 152 01 00 | 57           | 53            | 48.5         | 28     | sh.                  |
| 1406       | Aug. 21 | 57 49 00    | 151 53 00 | 57           | 53            | 44.6         | 56     | gy. s. brk. sh.      |
| 1407       | Aug. 21 | 57 52 00    | 151 47 00 | 56           | 55            | 45.1         | 47     | gy. s.               |
| 1408       | Aug. 21 | 57 49 00    | 151 39 00 | 56           | 55            | 47.3         | 30     | g. sh.               |
| 1409       | Aug. 21 | 57 46 00    | 151 32 00 | 62           | 55            | 48.8         | 33     | g. sh.               |
| 1410       | Aug. 21 | 57 43 00    | 151 25 00 | 56           | 52            | 48.1         | 35     | crs. gy. s. brk. sh. |
| 1411       | Aug. 21 | 57 39 00    | 151 18 00 | 56           | 52            | 47.3         | 38     | sh. co.              |
| 1412       | Aug. 21 | 57 36 00    | 151 11 00 | 55           | 52            | 46           | 42     | sh.                  |
| 1413       | Aug. 21 | 57 29 00    | 150 56 00 | 54           | 53            | 44.3         | 48     | gy. s. sh.           |
| 1414       | Aug. 21 | 57 23 00    | 150 41 00 | 55           | 55            | 42.7         | 57     | gy. s.               |
| 1415       | Aug. 22 | 57 19 00    | 150 35 00 | 55           | 56            | 41.6         | 72     | gy. s. p.            |
| 1416       | Aug. 22 | 57 26 00    | 150 06 00 | 56           | 57            | 39.6         | 200    | gy. s. bk. sp.       |
| 1417       | Aug. 22 | 57 32 00    | 150 18 00 | 56           | 56            | 42.6         | 59     | gv. s. g.            |
| 1418       | Aug. 22 | 57 39 00    | 150 33 00 | 54           | 52            | 45.1         | 51     | s. brk. sh.          |
| 1419       | Aug. 22 | 57 44 00    | 150 46 00 | 55           | 53            | 46.8         | 43     | s brk. sh.           |
| 1420       | Aug. 22 | 57 51 00    | 151 00 00 | 58           | 53            | 46.5         | 40     | s. g.                |
| 1421       | Aug. 22 | 57 57 00    | 151 08 00 | 55           | 54            | 46.5         | 36     | brk. s. g.           |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.            | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|-----------------------|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|                       |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Off Alaska.           |         |           |           |              |               |              |        |                      |
|                       | 1888.   | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1422                  | Aug. 22 | 58 03 00  | 151 26 00 | 55           | 54            | 44.1         | 78     | fne. gy. s.          |
| 1423                  | Aug. 22 | 58 14 00  | 151 23 00 | 59           | 56            | 44.1         | 41     | g.                   |
| 1424                  | Aug. 22 | 58 20 00  | 151 11 00 | 59           | 53            | 43.6         | 60     | gy. s. g.            |
| 1425                  | Aug. 22 | 58 12 00  | 151 01 00 | 63           | 53            | 44.1         | 56     | gy. s. brk. sh.      |
| 1426                  | Aug. 22 | 57 58 00  | 150 32 00 | 59           | 56            | 41.3         | 102    | gy. s.               |
| 1427                  | Aug. 22 | 57 52 00  | 150 16 00 | 56           | 55            | 41.1         | 114    | gy. s. bk. sp.       |
| 1428                  | Aug. 22 | 57 47 00  | 150 00 00 | 54           | 55            | 41.3         | 113    | gy. s. bk. sp.       |
| 1429                  | Aug. 23 | 57 41 00  | 149 44 00 | 55           | 56            | 41.1         | 140    | gy. s. bk. sp.       |
| 1430                  | Aug. 23 | 57 47 00  | 149 31 00 | 55           | 56            | 41.6         | 119    | gy. s. bk. sp.       |
| 1431                  | Aug. 23 | 57 53 00  | 149 19 00 | 55           | 56            | 41.1         | 166    | gy. s. bk. sp.       |
| 1432                  | Aug. 28 | 57 59 00  | 149 33 00 | 54           | 56            | 41.5         | 112    | gy. s.               |
| 1433                  | Aug. 23 | 58 05 00  | 149 48 00 | 59           | 55            | 41.3         | 128    | gy. s.               |
| 1434                  | Aug. 23 | 58 11 00  | 150 03 00 | 63           | 56            | 44.1         | 69     | gy. s. p.            |
| 1435                  | Aug. 23 | 58 17 00  | 150 17 00 | 64           | 56            | 49.1         | 37     | brk. sh. g.          |
| 1436                  | Aug. 23 | 58 23 00  | 150 32 00 | 58           | 53            | 48.5         | 37     | brk. sh.             |
| 1437                  | Aug. 23 | 58 29 00  | 150 48 00 | 58           | 54            | 44.1         | 50     | s. p. brk. sh.       |
| 1438                  | Aug. 23 | 58 35 00  | 151 03 00 | 57           | 54            | 41.1         | 99     | gy. s.               |
| 1439                  | Aug. 23 | 58 40 00  | 151 16 00 | 56           | 54            | 41.1         | 99     | rky.                 |
| 1440                  | Aug. 23 | 58 50 00  | 151 07 00 | 56           | 54            | 41.6         | 76     | gy. s.               |
| 1441                  | Aug. 23 | 58 57 00  | 151 00 00 | 56           | 54            | 41.2         | 97     | gy. m.               |
| 1442                  | Aug. 23 | 58 51 00  | 150 47 00 | 55           | 56            | 41.2         | 84     | gy. s.               |
| 1443                  | Aug. 23 | 58 46 00  | 150 33 00 | 55           | 55            | 41.3         | 105    | brk. sh. p.          |
| 1444                  | Aug. 23 | 58 40 00  | 150 17 00 | 55           | 54            | 41.1         | 69     | gy. s. brk. sh.      |
| 1445                  | Aug. 23 | 58 33 00  | 150 03 00 | 55           | 54            | 41.1         | 67     | gy. s. p.            |
| 1446                  | Aug. 23 | 58 27 00  | 149 47 00 | 55           | 54            | 40.9         | 84     | bk. s.               |
| 1447                  | Aug. 24 | 58 21 00  | 149 33 00 | 56           | 56            | 41.3         | 90     | gy. s.               |
| 1448                  | Aug. 24 | 58 14 00  | 149 17 00 | 56           | 56            | 41.2         | 85     | gy. s.               |
| 1449                  | Aug. 24 | 58 08 00  | 149 04 00 | 56           | 56            | 41.7         | 77     | gy. s. p.            |
| 1450                  | Aug. 24 | 58 01 00  | 148 49 00 | 56           | 56            | 41.6         | 98     | gy. s.               |
| 1451                  | Aug. 24 | 57 54 00  | 148 34 00 | 57           | 56            | 38.1         | 507    | bu. m.               |
| 1452                  | Aug. 24 | 58 00 00  | 148 20 00 | 60           | 59            | 37.6         | 594    | bk. s. g.            |
| 1453                  | Aug. 24 | 58 10 00  | 148 20 00 | 62           | 59            | 37           | 761    | bu. m.               |
| 1454                  | Aug. 24 | 58 24 00  | 148 46 00 | 60           | 59            | 41.7         | 71     | gy. s.               |
| 1455                  | Aug. 24 | 58 31 00  | 148 57 00 | 58           | 57            | 41.8         | 66     | gy. s. g. sh.        |
| 1456                  | Aug. 24 | 58 39 00  | 149 08 00 | 58           | 57            | 42.1         | 72     | gy. s.               |
| 1457                  | Aug. 24 | 58 46 00  | 149 17 00 | 57           | 56            | 41.6         | 103    | bu. m.               |
| 1458                  | Aug. 24 | 58 53 00  | 149 30 00 | 57           | 57            | 41.6         | 122    | gy. m.               |
| 1459                  | Aug. 24 | 58 44 00  | 149 02 00 | 57           | 56            | -----        | 118    | gy. s.               |
| 1460                  | Aug. 24 | 58 37 00  | 148 45 00 | 57           | 56            | 41.8         | 99     | gy. s.               |
| 1461                  | Aug. 24 | 58 30 00  | 148 29 00 | 57           | 57            | 41.5         | 106    | g. s.                |
| 1462                  | Aug. 25 | 58 23 00  | 148 07 00 | 57           | 57            | 36           | 902    | bu. m.               |
| 1463                  | Aug. 25 | 58 32 00  | 148 07 00 | 57           | 58            | 39.1         | 358    | bu. m.               |
| 1464                  | Aug. 25 | 58 41 00  | 148 07 00 | 57           | 58            | 40.9         | 151    | gy. s.               |
| 1465                  | Aug. 25 | 58 37 00  | 147 50 00 | 57           | 58            | -----        | 301    | s. g.                |
| 1466                  | Aug. 25 | 58 45 00  | 147 50 00 | 62           | 59            | 38           | 537    | bu. m.               |
| 1467                  | Aug. 25 | 58 54 00  | 147 50 00 | 63           | 57            | 41.8         | 87     | sh.                  |
| 1468                  | Aug. 25 | 59 02 00  | 147 50 00 | 64           | 56            | 41.7         | 101    | m. g.                |
| 1469                  | Aug. 25 | 59 05 00  | 147 33 00 | 62           | 56            | 39.2         | 308    | s. r.                |
| 1470                  | Aug. 25 | 59 10 00  | 147 17 00 | 61           | 57            | 40.1         | 252    | rky.                 |
| 1471                  | Aug. 25 | 59 15 00  | 147 00 00 | 59           | 53            | 41.1         | 109    | bu. m.               |
| 1472                  | Aug. 25 | 59 20 00  | 146 42 00 | 57           | 53            | 42.6         | 92     | bu. m.               |
| 1473                  | Aug. 25 | 59 21 00  | 146 26 00 | 59           | 53            | 44.8         | 45     | rky.                 |
| 1474                  | Aug. 25 | 59 24 00  | 146 19 00 | 58           | 53            | 51.8         | 11     | rky.                 |
| 1475                  | Aug. 26 | 59 20 00  | 146 23 00 | 61           | 53            | 49.8         | 15     | g. p.                |
| 1476                  | Aug. 26 | 59 12 00  | 146 20 00 | 58           | 53            | -----        | 22     | No specimen.         |
| 1477                  | Aug. 26 | 59 09 00  | 146 13 00 | 58           | 53            | 41.2         | 141    | p.                   |
| 1478                  | Aug. 26 | 59 03 00  | 145 56 00 | 61           | 57            | 37           | 620    | bu. m.               |
| 1479                  | Aug. 26 | 58 51 00  | 145 25 00 | 59           | 56            | 35           | 2,425  | m.                   |
| 1480                  | Aug. 27 | 59 01 00  | 144 22 00 | 59           | 59            | 35           | 2,220  | gy. oz.              |
| 1481                  | Aug. 27 | 59 08 00  | 143 30 00 | 60           | 59            | 35           | 2,138  | gy. oz.              |
| 1482                  | Aug. 27 | 59 12 00  | 143 00 00 | 63           | 59            | 35.1         | 1,528  | gy. oz.              |
| 1483                  | Aug. 27 | 59 00 00  | 142 37 00 | 65           | 60            | 35           | 1,764  | gy. oz.              |
| 1484                  | Aug. 27 | 58 54 00  | 142 33 00 | 64           | 60            | 35           | 1,745  | br. and gy. oz.      |
| 1485                  | Aug. 27 | 58 56 00  | 142 18 00 | 62           | 60            | 35           | 1,675  | br. and gy. oz.      |
| 1486                  | Aug. 27 | 58 58 00  | 141 59 00 | 60           | 59            | 35           | 1,500  | gy. oz.              |
| 1487                  | Aug. 27 | 58 51 00  | 141 46 00 | 60           | 60            | 35.1         | 1,548  | gy. oz.              |
| 1488                  | Aug. 28 | 58 17 00  | 140 35 00 | 60           | 60            | 35           | 1,815  | gy. oz.              |
| 1489                  | Aug. 28 | 57 45 00  | 139 25 00 | 56           | 58            | -----        | 1,778  | br. and gy. oz.      |
| 1490                  | Aug. 29 | 56 35 00  | 137 55 00 | 57           | 57            | -----        | 1,433  | No specimen.         |
| Off British Columbia. |         |           |           |              |               |              |        |                      |
| 1491                  | Aug. 30 | 54 02 00  | 134 34 00 | 57           | 57            | 35.3         | 1,571  | br. and gy. oz.      |
| 1492                  | Aug. 30 | 52 32 00  | 133 05 00 | 67           | 60            | 35.1         | 1,601  | gy. oz.              |
| 1493                  | Aug. 31 | 51 34 00  | 131 25 00 | 59           | 59            | 35.9         | 1,099  | gn. m.               |
| 1494                  | Aug. 31 | 51 09 00  | 129 07 00 | -----        | -----         | 42           | 83     | gn. m.               |
| 1495                  | Aug. 31 | 51 01 00  | 128 25 00 | -----        | -----         | -----        | 52     | gy. s.               |
| 1496                  | Sept. 1 | 50 56 00  | 128 09 00 | -----        | -----         | -----        | 22     | No specimen.         |
| 1497                  | Sept. 1 | 50 55 00  | 128 00 00 | -----        | -----         | -----        | 16     | No specimen.         |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.    | Position.                               |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|----------|---|-----------|--------------|---------------|--------------|--------|----------------------|
|            |          | Lat. N.                                 | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |          | <i>Off west coast of United States.</i> |           |              |               |              |        |                      |
|            | 1888.    | ° ' "                                   | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1498       | Sept. 19 | 48 20 00                                | 124 58 00 | 54           | 52            | 44.2         | 82     | rky.                 |
| 1499       | Sept. 19 | 48 18 00                                | 125 05 30 | 54           | 52            | 44.2         | 106    | bk.s.                |
| 1500       | Sept. 19 | 48 16 00                                | 125 12 30 | 57           | 52            | 43.7         | 108    | r.                   |
| 1501       | Sept. 19 | 48 14 00                                | 125 19 30 | 57           | 57            | -----        | 55     | yl.s.                |
| 1502       | Sept. 19 | 48 12 00                                | 125 26 30 | 57           | 57            | 45.7         | 70     | bk.s.                |
| 1503       | Sept. 19 | 48 10 00                                | 125 33 30 | 59           | 60            | 45.2         | 86     | bk.s.                |
| 1504       | Sept. 19 | 48 08 00                                | 125 40 30 | 59           | 61            | 44.8         | 105    | bk.s.                |
| 1505       | Sept. 19 | 48 06 00                                | 125 47 30 | 59           | 61            | 38.2         | 586    | gn.m.                |
| 1506       | Sept. 19 | 48 04 00                                | 125 54 30 | 59           | 59            | 38.6         | 505    | gn.m.                |
| 1507       | Sept. 19 | 48 03 00                                | 126 01 30 | 60           | 59            | 38           | 692    | gn.m.                |
| 1508       | Sept. 19 | 48 01 00                                | 126 09 00 | 62           | 60            | 37.2         | 768    | br.m.                |
| 1509       | Sept. 19 | 47 59 00                                | 126 15 00 | 62           | 60            | 36.7         | 856    | br.m.                |
| 1510       | Sept. 19 | 47 57 00                                | 126 22 30 | 62           | 60            | 36.7         | 816    | br.m.                |
| 1511       | Sept. 19 | 47 55 00                                | 126 29 00 | 61           | 59            | -----        | 1,239  | br.m.                |
| 1512       | Sept. 20 | 48 07 00                                | 125 03 00 | 57           | 58            | 44.7         | 80     | gn.m.                |
| 1513       | Sept. 20 | 48 07 00                                | 125 00 30 | 58           | 58            | -----        | 178    | fne.gy.s.            |
| 1514       | Sept. 20 | 48 05 00                                | 125 08 00 | 58           | 58            | 44.7         | 77     | gy.s. and p.         |
| 1515       | Sept. 20 | 48 03 00                                | 125 15 00 | 59           | 57            | 44.7         | 82     | p.                   |
| 1516       | Sept. 20 | 48 01 00                                | 125 22 00 | 59           | 59            | 42.7         | 218    | bu.m. and g.         |
| 1517       | Sept. 21 | 47 59 00                                | 125 29 00 | 59           | 59            | 44.7         | 90     | s. and g.            |
| 1518       | Sept. 21 | 47 58 00                                | 125 35 00 | 58           | 57            | 43.2         | 141    | s. and g.            |
| 1519       | Sept. 21 | 47 56 00                                | 125 42 30 | 59           | 59            | 39.7         | 378    | gn.m.                |
| 1520       | Sept. 21 | 47 52 00                                | 125 35 00 | 59           | 58            | 40.2         | 274    | g.                   |
| 1521       | Sept. 21 | 47 49 00                                | 125 28 00 | 58           | 58            | 39.7         | 462    | yl. oz.              |
| 1522       | Sept. 21 | 47 46 00                                | 125 20 30 | 58           | 58            | 39.1         | 522    | yl. oz.              |
| 1523       | Sept. 21 | 47 47 00                                | 125 14 00 | 60           | 58            | 40.1         | 378    | yl. oz.              |
| 1524       | Sept. 21 | 47 48 00                                | 125 07 00 | 60           | 58            | 42.9         | 206    | gy. oz.              |
| 1525       | Sept. 21 | 47 49 00                                | 124 59 00 | 60           | 58            | 45.1         | 67     | No specimen.         |
| 1526       | Sept. 21 | 47 51 00                                | 124 52 00 | 63           | 58            | 46.5         | 52     | gy.s. and p.         |
| 1527       | Sept. 21 | 47 48 00                                | 124 43 00 | 61           | 58            | 48.1         | 30     | gy.s.                |
| 1528       | Sept. 21 | 47 43 00                                | 124 41 00 | 61           | 59            | 48.1         | 33     | fne.gy.s.            |
| 1529       | Sept. 21 | 47 36 00                                | 124 46 00 | 63           | 58            | 49.1         | 53     | bk.s.                |
| 1530       | Sept. 21 | 47 35 00                                | 124 53 00 | 63           | 58            | 45.7         | 75     | fne.gy.s.            |
| 1531       | Sept. 21 | 47 33 00                                | 125 01 00 | 63           | 58            | 44.9         | 111    | fne.bk.s.            |
| 1532       | Sept. 21 | 47 32 00                                | 125 08 00 | 63           | 58            | 41.1         | 287    | bu.m.                |
| 1533       | Sept. 21 | 47 27 00                                | 125 06 00 | 60           | 59            | 39.2         | 535    | bu.m.                |
| 1534       | Sept. 21 | 47 22 00                                | 125 03 30 | 60           | 59            | 37.1         | 758    | gy. oz.              |
| 1535       | Sept. 21 | 47 17 00                                | 125 01 30 | 59           | 59            | 38.3         | 578    | gy. oz.              |
| 1536       | Sept. 21 | 47 18 00                                | 124 54 00 | 58           | 58            | 40.1         | 386    | No specimen.         |
| 1537       | Sept. 22 | 47 19 00                                | 124 47 00 | 58           | 58            | 44.9         | 82     | bu.m.                |
| 1538       | Sept. 22 | 47 21 00                                | 124 39 30 | 57           | 57            | 45.9         | 51     | fne.bk.s.            |
| 1539       | Sept. 22 | 47 22 00                                | 124 32 00 | 57           | 57            | 46.9         | 28     | g. and p.            |
| 1540       | Sept. 22 | 47 17 09                                | 124 30 00 | 57           | 57            | 47.6         | 28     | gy.s.                |
| 1541       | Sept. 22 | 47 12 00                                | 124 28 00 | 57           | 57            | 46.9         | 28     | p.                   |
| 1542       | Sept. 22 | 47 07 00                                | 124 26 00 | 56           | 57            | 48.1         | 28     | gy.s.                |
| 1543       | Sept. 22 | 47 05 00                                | 124 32 30 | 56           | 57            | 46.6         | 41     | bk.s.                |
| 1544       | Sept. 22 | 47 04 00                                | 124 39 30 | 56           | 57            | 46           | 56     | bk.s.                |
| 1545       | Sept. 22 | 47 02 00                                | 124 47 00 | 56           | 57            | 45.9         | 74     | bk.s. p.             |
| 1546       | Sept. 22 | 47 00 00                                | 124 53 30 | 54           | 56            | 44.9         | 93     | gn.m.                |
| 1547       | Sept. 22 | 46 58 00                                | 125 00 30 | 54           | 56            | 39.7         | 438    | gn.m.                |
| 1548       | Sept. 22 | 46 53 00                                | 124 57 00 | 56           | 58            | 39.4         | 450    | gn.m.                |
| 1549       | Sept. 22 | 46 54 00                                | 124 50 00 | 56           | 58            | -----        | 91     | No specimen.         |
| 1550       | Sept. 22 | 46 56 00                                | 124 43 00 | 57           | 59            | -----        | 78     | g.s.                 |
| 1551       | Sept. 22 | 46 51 00                                | 124 41 00 | 57           | 59            | 46           | 76     | g.m.                 |
| 1552       | Sept. 22 | 46 50 00                                | 124 48 00 | 57           | 60            | 46           | 87     | rky.                 |
| 1553       | Sept. 22 | 46 48 00                                | 124 55 00 | 57           | 59            | -----        | 250    | rky.                 |
| 1554       | Sept. 22 | 46 43 00                                | 124 52 00 | 58           | 60            | 44.9         | 181    | rky.                 |
| 1555       | Sept. 22 | 46 45 00                                | 124 44 00 | 58           | 60            | 46           | 80     | gy.s.                |
| 1556       | Sept. 22 | 46 47 00                                | 124 37 00 | 60           | 60            | 46.1         | 64     | rky.                 |
| 1557       | Sept. 22 | 46 49 00                                | 124 30 00 | 60           | 59            | 47           | 42     | rky.                 |
| 1558       | Sept. 22 | 46 51 00                                | 124 22 30 | 60           | 59            | 48.1         | 33     | gy. and bk.s.        |
| 1559       | Sept. 22 | 46 54 00                                | 124 15 00 | 60           | 59            | 57.8         | 18     | gy.s.                |
| 1560       | Sept. 22 | 46 54 00                                | 124 22 30 | 57           | 59            | 48.3         | 35     | fne.gy.s.            |
| 1561       | Sept. 22 | 46 54 00                                | 124 30 00 | 58           | 59            | 47           | 48     | fne.gy.s.            |
| 1562       | Sept. 22 | 46 51 00                                | 124 35 00 | 57           | 59            | 46.4         | 58     | fne.gy.s.            |
| 1563       | Sept. 22 | 46 55 00                                | 124 39 00 | 57           | 59            | 55.8         | 64     | fne.gy.s.            |
| 1564       | Sept. 22 | 46 52 00                                | 124 45 00 | 57           | 53            | 46           | 78     | fne.bk.s.            |
| 1565       | Sept. 22 | 46 47 00                                | 124 43 00 | 58           | 60            | 45.5         | 81     | gy.s.                |
| 1566       | Sept. 22 | 46 36 00                                | 124 39 00 | 58           | 60            | 45           | 132    | rky.                 |
| 1567       | Sept. 22 | 46 53 00                                | 124 32 00 | 58           | 60            | 45.4         | 72     | gy.m.                |
| 1568       | Sept. 22 | 46 40 00                                | 124 25 00 | 58           | 59            | 46           | 50     | gy.s.                |
| 1569       | Sept. 23 | 46 41 00                                | 124 18 00 | 57           | 58            | 46.7         | 37     | gy.s.                |
| 1570       | Sept. 23 | 46 37 00                                | 124 17 30 | 57           | 58            | 46.1         | 37     | hrd.s.               |
| 1571       | Sept. 23 | 46 35 00                                | 124 24 30 | 58           | 58            | -----        | 51     | hrd.s.               |
| 1572       | Sept. 23 | 46 33 00                                | 124 31 00 | 58           | 58            | 45.1         | 82     | hrd.s.               |
| 1573       | Sept. 23 | 46 31 00                                | 124 38 00 | 58           | 58            | 39.2         | 433    | No specimen.         |
| 1574       | Sept. 25 | 48 34 00                                | 124 53 00 | 55           | 51            | 45.8         | 65     | gn.m.                |
| 1575       | Sept. 29 | 48 27 00                                | 125 09 00 | 54           | 53            | 45.2         | 60     | s.r.                 |
| 1576       | Oct. 10  | 48 16 00                                | 123 40 00 | 52           | 49            | 45.2         | 101    | s.g.                 |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.                       | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|----------------------------------|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|                                  |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Off west coast of United States. |         |           |           |              |               |              |        |                      |
| 1888.                            |         |           |           |              |               |              |        |                      |
|                                  |         | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1577                             | Oct. 11 | 46 34 00  | 124 12 30 | 60           | 57            | 52.9         | 20     | gy. s.               |
| 1578                             | Oct. 11 | 46 33 00  | 124 19 00 | 61           | 58            | 47           | 38     | fne. gy. s.          |
| 1579                             | Oct. 11 | 46 32 00  | 124 26 00 | 61           | 58            | 47           | 51     | fne. gy. s.          |
| 1580                             | Oct. 11 | 46 31 00  | 124 33 00 | 61           | 58            | 45           | 153    | gr. m.               |
| 1581                             | Oct. 11 | 46 30 00  | 124 39 30 | 61           | 58            | 39.6         | 432    | br. oz.              |
| 1582                             | Oct. 11 | 46 28 00  | 124 33 00 | 61           | 58            | 44.8         | 98     | fne. gy. s.          |
| 1583                             | Oct. 11 | 46 27 00  | 124 26 00 | 61           | 58            | 47           | 55     | bk. s.               |
| 1584                             | Oct. 11 | 46 25 00  | 124 20 00 | 60           | 58            | 47.9         | 40     | bu. m.               |
| 1585                             | Oct. 11 | 46 23 00  | 124 27 00 | 60           | 58            | 47           | 59     | fne. br. s.          |
| 1586                             | Oct. 11 | 46 22 00  | 124 34 00 | 58           | 59            | 46.5         | 78     | fne. gy. s.          |
| 1587                             | Oct. 11 | 46 21 00  | 124 41 00 | 58           | 59            | 42.5         | 260    | bu. m.               |
| 1588                             | Oct. 13 | 46 03 00  | 124 22 00 | 57           | 57            | 45.1         | 73     | fne. gy. s.          |
| 1589                             | Oct. 13 | 46 02 00  | 124 29 00 | 57           | 57            | 45.8         | 82     | fne. gy. s.          |
| 1590                             | Oct. 13 | 46 00 00  | 124 36 00 | 58           | 56            | 46           | 96     | br. s.               |
| 1591                             | Oct. 13 | 45 58 00  | 124 42 30 | 58           | 56            | 43.8         | 199    | gy. oz.              |
| 1592                             | Oct. 13 | 46 03 00  | 124 45 00 | 60           | 61            | 44.2         | 174    | gy. oz.              |
| 1593                             | Oct. 13 | 46 07 00  | 124 48 00 | 62           | 62            | 38.8         | 601    | br. oz.              |
| 1594                             | Oct. 13 | 46 08 00  | 124 39 00 | 64           | 60            | 45.9         | 102    | bk. s.               |
| 1595                             | Oct. 13 | 46 08 00  | 124 31 00 | 64           | 60            | 46.1         | 78     | fne. gy. s.          |
| 1596                             | Oct. 13 | 46 17 00  | 124 21 30 | 62           | 60            | 46.6         | 81     | bu. m.               |
| 1597                             | Oct. 13 | 46 16 00  | 124 28 30 | 58           | 57            | 43.1         | 231    | bu. m.               |
| 1598                             | Oct. 13 | 46 15 00  | 124 36 00 | 57           | 57            | 39.8         | 421    | br. oz.              |
| 1599                             | Oct. 13 | 46 14 00  | 124 42 30 | 57           | 56            | 39.6         | 475    | gy. oz.              |
| 1600                             | Oct. 13 | 46 13 00  | 124 50 00 | 56           | 56            | 39.3         | 506    | br. oz.              |
| 1601                             | Oct. 19 | 44 04 00  | 124 53 00 | 57           | 57            | 47.1         | 56     | m.                   |
| 1602                             | Oct. 19 | 44 02 00  | 124 55 00 | 57           | 57            | 47.6         | 51     | crs. bk. s.          |
| 1603                             | Oct. 19 | 43 59 00  | 125 02 00 | 60           | 58            | 46.2         | 91     | bk. s. g.            |
| 1604                             | Oct. 19 | 43 59 00  | 125 05 00 | 60           | 58            | 38.7         | 563    | gy. m.               |
| 1605                             | Oct. 19 | 43 54 00  | 125 05 00 | 60           | 59            | 40.3         | 355    | bk. s.               |
| 1606                             | Oct. 19 | 43 50 00  | 125 01 30 | 60           | 59            | 42.1         | 299    | gy. c.               |
| 1889.                            |         |           |           |              |               |              |        |                      |
| 1607                             | Jan. 5  | 34 00 00  | 120 30 00 | 64           | 59            | 46.3         | 226    | gy. s.               |
| 1608                             | Jan. 8  | 34 25 30  | 120 20 30 |              |               |              | 21     | gy. s. m. brk. sh.   |
| 1609                             | Jan. 15 | 32 36 30  | 117 20 30 | 57           | 59            | 53           | 97     | yl. m.               |
| 1610                             | Jan. 15 | 32 36 00  | 117 26 00 | 57           | 59            | 43           | 324    | yl. m.               |
| 1611                             | Jan. 15 | 32 35 30  | 117 32 00 | 56           | 59            | 38.7         | 660    | br. oz.              |
| 1612                             | Jan. 15 | 32 34 30  | 117 43 30 | 56           | 59            | 44.5         | 266    | rky.                 |
| 1613                             | Jan. 15 | 32 33 30  | 117 55 00 | 55           | 58            | 46           | 211    | rky.                 |
| 1614                             | Jan. 15 | 32 32 00  | 118 07 00 | 57           | 58            | 37           | 1,047  | gy. m.               |
| 1615                             | Jan. 16 | 32 31 00  | 118 18 30 | 55           | 59            | 37.8         | 770    | fne. s. bk. sp.      |
| 1616                             | Jan. 16 | 32 30 00  | 118 30 30 | 55           | 59            | 37.5         | 615    | fne. s. g.           |
| 1617                             | Jan. 16 | 32 29 00  | 118 42 00 | 55           | 59            |              | 324    | r.                   |
| 1618                             | Jan. 16 | 32 28 30  | 118 48 00 | 55           | 59            | 38.6         | 741    | gn. oz.              |
| 1619                             | Jan. 16 | 32 28 00  | 118 53 30 | 55           | 59            | 43.2         | 692    | gn. oz.              |
| 1620                             | Jan. 16 | 32 27 30  | 118 59 00 | 55           | 59            | 42.2         | 389    | gy. s. brk. sh.      |
| 1621                             | Jan. 16 | 32 25 30  | 119 05 00 | 56           | 59            | 59.5         | 17     | rky.                 |
| 1622a                            | Jan. 16 | 32 25 15  | 119 04 30 | 56           | 59            |              | 6      | rky.                 |
| 1622                             | Jan. 16 | 32 20 00  | 119 04 30 | 56           | 59            | 43           | 337    | s. g.                |
| 1623                             | Jan. 16 | 32 15 00  | 119 06 30 | 56           | 59            | 38           | 713    | gy. m.               |
| 1624                             | Jan. 16 | 32 20 00  | 119 08 30 | 57           | 59            | 40.8         | 449    | rky.                 |
| 1625                             | Jan. 16 | 32 22 30  | 119 09 30 | 57           | 59            | 46.3         | 186    | gy. s.               |
| 1626                             | Jan. 16 | 32 24 30  | 119 10 30 | 57           | 58            | 51.1         | 77     | gy. s.               |
| 1627                             | Jan. 16 | 32 23 00  | 119 12 00 | 57           | 58            | 46.6         | 176    | gy. s.               |
| 1628                             | Jan. 16 | 32 21 00  | 119 15 00 | 57           | 58            | 42.2         | 386    | gy. s.               |
| 1629                             | Jan. 17 | 32 17 30  | 119 19 00 | 56           | 59            | 44.7         | 295    | rky.                 |
| 1630                             | Jan. 17 | 32 27 30  | 119 15 30 | 57           | 58            | 48.7         | 156    | gy. s.               |
| 1631                             | Jan. 17 | 32 29 30  | 119 14 30 | 57           | 58            | 54.3         | 47     | bk. s. g.            |
| 1632                             | Jan. 17 | 32 29 45  | 119 13 00 | 57           | 59            | 58.6         | 26     | bk. s. g.            |
| 1633                             | Jan. 17 | 32 29 00  | 119 14 00 | 59           | 59            |              | 43     | bk. s. g.            |
| 1634                             | Jan. 17 | 32 27 30  | 119 12 30 | 59           | 60            | 54.1         | 46     | gy. s.               |
| 1635                             | Jan. 17 | 32 28 00  | 119 11 30 | 59           | 60            | 55.4         | 44     | rky.                 |
| 1636                             | Jan. 17 | 32 28 30  | 119 11 00 | 64           | 59            | 54.9         | 45     | gy. s. bk. sp. c.    |
| 1637                             | Jan. 17 | 32 27 00  | 119 11 00 | 64           | 59            | 54.7         | 48     | co. brk. sh.         |
| 1638                             | Jan. 17 | 32 26 45  | 119 09 30 | 64           | 59            | 55.3         | 47     | bk. s. brk. sh.      |
| 1639                             | Jan. 17 | 32 26 30  | 119 08 30 | 64           | 60            | 59.4         | 30     | gy. s. brk. sh.      |
| 1640                             | Jan. 17 | 32 26 30  | 119 07 30 | 60           | 59            |              | 11     | rky.                 |
| 1641                             | Jan. 17 | 32 28 00  | 119 05 30 | 60           | 59            | 54.5         | 51     | r. gy. s. brk. sh.   |
| 1642                             | Jan. 17 | 32 30 00  | 119 06 15 | 57           | 58            | 49.1         | 113    | gy. s. g.            |
| 1643                             | Jan. 17 | 32 32 00  | 119 07 00 | 57           | 58            | 46.9         | 174    | r.                   |
| 1644                             | Jan. 17 | 32 34 15  | 119 08 00 | 57           | 58            | 47.4         | 153    | gy. s.               |
| 1645                             | Jan. 17 | 32 39 00  | 119 10 00 | 55           | 57            | 50.1         | 106    | brk. sh. g.          |
| 1646                             | Jan. 17 | 32 45 00  | 119 11 30 | 55           | 57            | 53.4         | 59     | gy. s.               |
| 1647                             | Jan. 17 | 32 47 45  | 119 12 30 | 56           | 58            | 55.4         | 243    | gy. s.               |
| 1648                             | Jan. 17 | 32 53 00  | 119 12 30 | 56           | 58            | 40.3         | 495    | br. m.               |
| 1649                             | Jan. 17 | 32 59 00  | 119 14 00 | 56           | 58            | 39.4         | 614    | br. m.               |
| 1650                             | Jan. 18 | 33 05 00  | 119 15 00 | 56           | 58            | 39           | 892    | m.                   |
| 1651                             | Jan. 18 | 33 10 00  | 119 21 00 | 55           | 58            | 43.5         | 310    | m.                   |
| 1652                             | Jan. 18 | 33 12 00  | 119 23 00 | 55           | 58            | 54.1         | 47     | fne. gy. s.          |



*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.                               |           | Temperature. |               |              | Depth. | Character of bottom.         |
|------------|---------|---|-----------|--------------|---------------|--------------|--------|------------------------------|
|            |         | Lat. N.                                 | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                              |
|            |         | <i>Off west coast of United States.</i> |           |              |               |              |        |                              |
|            | 1889.   | ° ' "                                   | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                              |
| 1653       | Jan. 18 | 33 11 00                                | 119 19 15 | 59           | 59            | 40.8         | 464    | br. s. g.                    |
| 1654       | Jan. 18 | 33 09 30                                | 119 12 30 | 64           | 61            | 39           | 950    | gn. oz.                      |
| 1655       | Jan. 18 | 33 06 30                                | 118 38 30 | 67           | 61            | 39           | 924    | m.                           |
| 1656       | Jan. 18 | 33 03 15                                | 118 45 30 | 59           | 59            | 39.2         | 766    | gy. s.                       |
| 1657       | Jan. 18 | 33 08 00                                | 118 34 30 | 58           | 59            | 40.7         | 485    | m.                           |
| 1658       | Jan. 18 | 33 08 30                                | 118 22 30 | 57           | 59            | 40           | 560    | m.                           |
| 1659       | Jan. 18 | 33 03 00                                | 118 12 30 | 56           | 58            | 39.8         | 552    | m.                           |
| 1660       | Jan. 19 | 32 57 00                                | 118 02 30 | 56           | 58            | 40.7         | 426    | gy. oz.                      |
| 1661       | Jan. 19 | 32 52 00                                | 117 52 00 | 56           | 59            | 54.9         | 360    | gy. oz.                      |
| 1662       | Jan. 19 | 32 46 00                                | 117 41 30 | 55           | 59            | 41.4         | 428    | gn. m.                       |
| 1663       | Jan. 23 | 32 46 30                                | 118 00 30 | 58           | 59            | 41.6         | 395    | r.                           |
| 1664       | Jan. 24 | 32 47 30                                | 118 29 30 | 58           | 58            | 46.9         | 219    | r.                           |
| 1665       | Jan. 24 | 32 47 00                                | 118 37 00 | 59           | 59            | 39           | 657    | gy. m.                       |
| 1666       | Jan. 24 | 32 46 15                                | 118 44 00 | 59           | 59            | 39           | 613    | r. crs. gy. s.               |
| 1667       | Jan. 24 | 32 44 00                                | 118 53 00 | 59           | 59            | 39           | 807    | gn. m.                       |
| 1668       | Jan. 24 | 32 44 00                                | 119 00 00 | 58           | 59            | 39.5         | 569    | gn. m.                       |
| 1669       | Jan. 24 | 32 43 45                                | 119 06 45 | 58           | 59            | 45.1         | 241    | yl. s.                       |
| 1670       | Jan. 24 | 32 43 45                                | 119 09 15 | 58           | 59            | 56.1         | 56     | gy. s. brk. sh.              |
| 1671       | Jan. 24 | 32 43 45                                | 119 11 30 | 59           | 60            | 56.1         | 43     | brk. sh. g.                  |
| 1672       | Jan. 24 | 32 43 45                                | 119 14 00 | 59           | 60            | 55.3         | 46     | r. sh.                       |
| 1673       | Jan. 24 | 32 43 45                                | 119 16 30 | 59           | 60            |              | 108    | g. brk. sh.                  |
| 1674       | Jan. 24 | 32 45 45                                | 119 15 15 | 59           | 60            | 52.8         | 83     | yl. s. g.                    |
| 1675       | Jan. 24 | 32 45 45                                | 119 12 30 | 59           | 60            | 52.8         | 71     | gy. s. brk. sh.              |
| 1676       | Jan. 24 | 32 46 00                                | 119 10 00 | 64           | 61            | 52.8         | 173    | gy. s.                       |
| 1677       | Jan. 24 | 32 46 00                                | 119 07 30 | 64           | 61            |              | 340    | br. m.                       |
| 1678       | Jan. 24 | 32 42 20                                | 119 05 15 | 66           | 61            | 54.9         | 53     | gy. s.                       |
| 1679       | Jan. 24 | 32 42 45                                | 119 07 15 | 66           | 61            | 56.9         | 28     | r.                           |
| 1680       | Jan. 24 | 32 42 45                                | 119 09 30 | 64           | 61            |              | 48     | r. brk. sh.                  |
| 1681       | Jan. 24 | 32 43 00                                | 119 11 30 | 64           | 61            | 55           | 62     | g. gy. s. brk. sh.           |
| 1682       | Jan. 24 | 32 43 00                                | 119 14 00 | 64           | 61            | 55           | 229    | r.                           |
| 1683       | Jan. 24 | 32 41 00                                | 119 12 45 | 63           | 61            | 47.4         | 153    | r.                           |
| 1684       | Jan. 24 | 32 41 00                                | 119 10 45 | 63           | 61            | 47.4         | 118    | gy. s.                       |
| 1685       | Jan. 24 | 32 41 15                                | 119 08 45 | 63           | 61            | 47.4         | 52     | s. brk. sh.                  |
| 1686       | Jan. 24 | 32 41 15                                | 119 06 15 | 71           | 61            | 47.5         | 55     | gy. s. brk. sh.              |
| 1687       | Jan. 24 | 32 41 30                                | 119 04 00 | 71           | 62            | 47.4         | 126    | gy. s.                       |
| 1688       | Jan. 24 | 32 39 45                                | 119 05 15 | 71           | 62            | 47.4         | 98     | gy. s.                       |
| 1689       | Jan. 24 | 32 39 30                                | 119 07 45 | 61           | 59            | 47.4         | 159    | r.                           |
| 1690       | Jan. 24 | 32 39 15                                | 119 10 00 | 61           | 59            | 47.3         | 110    | gy. s.                       |
| 1691       | Jan. 24 | 32 39 00                                | 119 12 15 | 61           | 59            | 47.2         | 125    | gy. s.                       |
| 1692       | Jan. 24 | 32 36 30                                | 119 12 15 | 58           | 59            | 49           | 107    | gy. s. g.                    |
| 1693       | Jan. 24 | 32 34 15                                | 119 12 00 | 58           | 59            | 50.5         | 88     | gy. s. brk. sh.              |
| 1694       | Jan. 24 | 32 32 00                                | 119 12 00 | 58           | 59            | 53           | 62     | gy. s.                       |
| 1695       | Jan. 24 | 32 30 15                                | 119 13 30 | 58           | 59            |              | 31     | brk. sh.                     |
| 1696       | Jan. 24 | 32 29 45                                | 119 11 30 | 58           | 59            | 53.1         | 47     | brk. sh.                     |
| 1697       | Jan. 24 | 32 31 00                                | 119 09 30 | 58           | 59            | 53.1         | 55     | crs. wh. and bk. s. brk. sh. |
| 1698       | Jan. 24 | 32 32 15                                | 119 07 45 | 58           | 59            | 53.6         | 63     | crs. bk. s. brk. sh.         |
| 1699       | Jan. 24 | 32 33 30                                | 119 06 00 | 58           | 58            | 45.6         | 214    | sh.                          |
| 1700       | Jan. 24 | 32 34 45                                | 119 04 00 | 58           | 58            | 45.4         | 367    | hrd. m.                      |
| 1701       | Jan. 24 | 32 32 30                                | 119 03 15 | 59           | 58            | 41.8         | 406    | gy. s. brk. sh.              |
| 1702       | Jan. 24 | 32 30 30                                | 119 02 30 | 59           | 58            | 41.6         | 286    | gy. s.                       |
| 1703       | Jan. 24 | 32 28 30                                | 119 01 45 | 59           | 58            | 41.8         | 141    | gy. s.                       |
| 1704       | Jan. 24 | 32 26 30                                | 119 01 15 | 59           | 58            |              | 60     | gy. s.                       |
| 1705       | Jan. 26 | 32 24 45                                | 117 21 00 | 60           | 59            | 39.7         | 533    | br. m.                       |
| 1706       | Jan. 26 | 32 25 00                                | 117 18 00 | 59           | 59            |              | 51     | hrd. m.                      |
| 1707       | Feb. 4  | 32 40 30                                | 117 19 00 | 58           | 59            | 56           | 45     | m.                           |
| 1708       | Feb. 4  | 32 55 30                                | 117 34 00 | 60           | 61            | 40.8         | 441    | gn. m.                       |
| 1709       | Feb. 4  | 33 00 00                                | 117 37 30 | 61           | 61            | 40.5         | 454    | gn. m.                       |
| 1710       | Feb. 4  | 33 08 00                                | 117 45 00 | 62           | 60            | 46.4         | 452    | gy. m.                       |
| 1711       | Feb. 4  | 33 11 30                                | 117 47 30 | 61           | 60            | 40.8         | 445    | gy. m.                       |
| 1712       | Feb. 4  | 33 15 00                                | 117 51 00 | 61           | 60            | 41           | 432    | gn. m.                       |
| 1713       | Feb. 4  | 33 18 45                                | 117 53 45 | 61           | 60            | 43.2         | 327    | r. bk. s.                    |
| 1714       | Feb. 4  | 33 22 30                                | 117 56 00 | 60           | 59            | 43.2         | 324    | gn. m.                       |
| 1715       | Feb. 4  | 33 26 00                                | 117 59 00 | 60           | 60            | 51           | 276    | gn. m.                       |
| 1716       | Feb. 4  | 33 29 30                                | 118 02 30 | 60           | 60            | 45           | 264    | gn. m.                       |
| 1717       | Feb. 5  | 33 33 30                                | 118 05 00 | 58           | 59            |              | 161    | gn. m.                       |
| 1718       | Feb. 5  | 33 38 30                                | 118 06 00 | 58           | 59            | 59           | 21     | hrd. m.                      |
| 1719       | Feb. 5  | 33 41 00                                | 118 16 30 | 54           | 57            |              | 18     | fne. gy. s.                  |
| 1720       | Feb. 5  | 33 40 00                                | 118 16 00 | 54           | 57            |              | 21     | fne. gy. s.                  |
| 1721       | Feb. 5  | 33 39 00                                | 118 15 00 | 54           | 57            | 57           | 26     | fne. gy. s.                  |
| 1722       | Feb. 5  | 33 37 00                                | 118 13 45 | 56           | 58            | 58           | 29     | fne. gy. s.                  |
| 1723       | Feb. 5  | 33 36 15                                | 118 13 00 | 56           | 58            | 58           | 29     | fne. gy. s.                  |
| 1724       | Feb. 5  | 33 34 30                                | 118 12 00 | 56           | 58            | 56           | 49     | fne. gy. s.                  |
| 1725       | Feb. 5  | 33 32 45                                | 118 10 45 | 56           | 58            | 49.5         | 115    | fne. gy. s.                  |
| 1726       | Feb. 6  | 34 06 00                                | 119 32 00 | 57           | 60            |              | 124    | gn. m.                       |
| 1727       | Feb. 6  | 34 05 00                                | 119 31 30 | 57           | 58            |              | 88     | gn. m.                       |
| 1728       | Feb. 6  | 34 04 00                                | 119 31 30 | 57           | 58            | 55.5         | 47     | gy. s. bk. sp.               |
| 1729       | Feb. 6  | 34 03 00                                | 119 29 15 | 57           | 58            | 55           | 48     | gv. s. bk. sp.               |
| 1730       | Feb. 6  | 34 03 30                                | 119 28 45 | 57           | 58            | 55.2         | 48     | gy. s. kb. sp.               |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                       | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom.    |
|----------------------------------|---------|-----------|-----------|--------------|---------------|--------------|--------|-------------------------|
|                                  |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                         |
| Off west coast of United States. |         |           |           |              |               |              |        |                         |
| 1889.                            |         |           |           |              |               |              |        |                         |
| 1731                             | Feb. 6  | 34 03 45  | 119 28 15 | 57           | 58            | 56           | 50     | gy. s. bk. sp. brk. sh. |
| 1732                             | Feb. 6  | 34 04 00  | 119 28 00 | 57           | 58            | 54           | 62     | fne. gy. s. g.          |
| 1733                             | Feb. 6  | 34 04 30  | 119 27 00 | 57           | 58            | 51.5         | 91     | fne. gy. s.             |
| 1734                             | Feb. 6  | 34 03 30  | 119 27 00 | 57           | 58            | 55.8         | 49     | gy. s.                  |
| 1735                             | Feb. 6  | 34 02 30  | 119 27 45 | 57           | 58            | 56           | 48     | gy. s. brk. sh.         |
| 1736                             | Feb. 6  | 34 01 45  | 119 28 00 | 57           | 58            | 55.5         | 42     | wh. s. g. brk. sh.      |
| 1737                             | Feb. 8  | 33 44 30  | 119 59 00 | 58           | 57            | -----        | 70     | p.                      |
| 1738                             | Feb. 8  | 33 48 00  | 120 10 30 | 57           | 59            | 44.4         | 261    | r.                      |
| 1739                             | Feb. 8  | 33 52 30  | 120 14 30 | 58           | 58            | 46.7         | 194    | gy. s.                  |
| 1740                             | Feb. 8  | 33 55 00  | 120 16 30 | 58           | 58            | 48.8         | 124    | fne. gy. s. r.          |
| 1741                             | Feb. 8  | 34 00 00  | 120 20 00 | 58           | 58            | 56           | 30     | fne. gy. s.             |
| 1742                             | Feb. 9  | 34 06 15  | 120 29 15 | 59           | 57            | -----        | 44     | r.                      |
| 1743                             | Feb. 9  | 34 07 00  | 120 26 00 | 66           | 57            | 54.9         | 41     | gy. s.                  |
| 1744                             | Feb. 9  | 34 07 00  | 120 25 00 | 66           | 57            | 55           | 36     | r.                      |
| 1745                             | Feb. 9  | 34 07 00  | 120 23 45 | 66           | 57            | 53.9         | 42     | g. brk. sh.             |
| 1746                             | Feb. 9  | 34 06 30  | 120 23 30 | 66           | 57            | 54.4         | 40     | gy. s.                  |
| 1747                             | Feb. 9  | 34 06 00  | 120 23 00 | 66           | 57            | 54.4         | 34     | brk. sh. r.             |
| 1748                             | Feb. 11 | 34 23 15  | 119 40 30 | 62           | 59            | -----        | 13     | co. sponge.             |
| 1749                             | Feb. 11 | 34 22 45  | 119 40 00 | 62           | 59            | -----        | 22     | m.                      |
| 1750                             | Feb. 11 | 34 23 15  | 119 39 45 | 62           | 60            | -----        | 13½    | r.                      |
| 1751                             | Feb. 11 | 34 23 40  | 119 39 50 | 62           | 60            | -----        | 13     | m.                      |
| 1752                             | Feb. 11 | 34 21 10  | 119 38 40 | 62           | 60            | 59           | 26     | m.                      |
| 1753                             | Feb. 11 | 34 21 00  | 119 37 45 | 66           | 61            | 59           | 26     | gy. s. r.               |
| 1754                             | Feb. 11 | 34 18 45  | 119 42 00 | 63           | 60            | 53.5         | 68     | gn. m.                  |
| 1755                             | Feb. 11 | 34 20 30  | 119 44 45 | 63           | 60            | 54.8         | 50     | gn. m. r.               |
| 1756                             | Feb. 12 | 33 59 45  | 119 21 30 | 70           | 60            | -----        | 52     | gy. s.                  |
| 1757                             | Feb. 12 | 34 00 00  | 119 21 30 | 70           | 60            | -----        | 36     | co. s. brk. sh.         |
| 1758                             | Feb. 12 | 33 42 45  | 119 24 30 | 67           | 61            | 40.5         | 825    | gn. m.                  |
| 1759                             | Feb. 12 | 33 37 30  | 119 25 00 | 64           | 61            | 40           | 917    | gn. m.                  |
| 1760                             | Feb. 12 | 33 30 30  | 119 25 30 | 64           | 61            | 39.8         | 899    | gn. m.                  |
| 1761                             | Feb. 12 | 33 24 00  | 119 26 30 | 62           | 60            | 41           | 416    | bk. s.                  |
| 1762                             | Feb. 12 | 33 19 30  | 119 27 00 | 62           | 60            | 57           | 40     | brk. sh.                |
| 1763                             | Feb. 13 | 33 17 30  | 119 24 30 | 61           | 58            | 55.5         | 42     | g. brk. sh. r.          |
| 1764                             | Feb. 13 | 33 17 45  | 119 28 30 | 61           | 58            | -----        | 32     | gy. s.                  |
| 1765                             | Feb. 13 | 33 14 15  | 119 23 30 | 60           | 58            | -----        | 21     | g.                      |
| 1766                             | Feb. 13 | 33 14 00  | 119 24 00 | 60           | 57            | -----        | 22½    | no specimen.            |
| 1767                             | Feb. 13 | 33 16 15  | 119 20 00 | 60           | 57            | 51.4         | 71     | co.                     |
| 1768                             | Feb. 13 | 33 20 00  | 119 14 30 | 62           | 58            | 39.5         | 644    | gy. s.                  |
| 1769                             | Feb. 14 | 33 28 15  | 118 58 00 | 55           | 56            | 46           | 185    | fne. bk. and wh. s.     |
| 1770                             | Feb. 14 | 33 27 30  | 118 51 00 | 55           | 56            | 39.4         | 718    | gn. m.                  |
| 1771                             | Feb. 14 | 33 26 15  | 118 43 15 | 56           | 57            | 40           | 551    | gn. m.                  |
| 1772                             | Feb. 26 | 32 22 30  | 117 18 00 | 61           | 60            | 52.8         | 76     | gy. s. g.               |
| 1773                             | Feb. 26 | 32 17 30  | 117 19 30 | 61           | 60            | 38           | 735    | gn. m.                  |
| 1774                             | Feb. 26 | 32 05 45  | 117 23 15 | 63           | 59            | 37.8         | 773    | gy. m.                  |
| Off west coast of Mexico.        |         |           |           |              |               |              |        |                         |
| 1775                             | Feb. 26 | 31 50 00  | 117 27 30 | 61           | 59            | 37.5         | 801    | gy. oz.                 |
| 1776                             | Feb. 26 | 31 29 30  | 117 33 00 | 60           | 59            | 37.5         | 803    | gy. oz.                 |
| 1777                             | Feb. 27 | 31 03 30  | 117 40 15 | 60           | 60            | 37.5         | 856    | gy. m.                  |
| 1778                             | Feb. 27 | 30 21 00  | 117 51 30 | 61           | 60            | 35.3         | 1,512  | choc. oz.               |
| 1779                             | Feb. 27 | 29 56 30  | 117 58 00 | 60           | 60            | 35           | 1,776  | br. m.                  |
| 1780                             | Feb. 27 | 29 38 00  | 118 06 15 | 62           | 62            | 35.2         | 1,857  | br. m.                  |
| 1781                             | Feb. 27 | 29 14 30  | 118 17 00 | 64           | 62            | 35.4         | 1,424  | gy. m. s.               |
| 1782                             | Feb. 27 | 29 08 30  | 118 13 30 | 63           | 61            | 35.5         | 1,447  | gy. s.                  |
| 1783                             | Feb. 28 | 28 56 15  | 118 18 00 | 61           | 61            | -----        | 29     | gy. s. brk. sh.         |
| 1784                             | Feb. 28 | 28 57 00  | 118 16 00 | 61           | 61            | 59           | 42     | g. sh.                  |
| 1785                             | Feb. 28 | 28 57 30  | 118 17 00 | 61           | 61            | -----        | 19½    | gy. s.                  |
| 1786                             | Feb. 28 | 28 48 00  | 118 17 00 | 61           | 61            | 36           | 1,121  | gy. m. s.               |
| 1787                             | Feb. 28 | 28 31 00  | 118 05 00 | 61           | 61            | 35           | 1,737  | gy. m.                  |
| 1788                             | Mar. 1  | 27 46 30  | 117 36 00 | 60           | 62            | -----        | 2,135  |                         |
| 1789                             | Mar. 1  | 26 58 00  | 117 04 00 | 65           | 63            | 34.8         | 2,065  | br. oz.                 |
| 1790                             | Mar. 1  | 26 12 00  | 116 37 00 | 75           | 65            | 34.9         | 2,124  | br. oz.                 |
| 1791                             | Mar. 2  | 25 29 00  | 116 09 00 | 65           | 64            | 35           | 2,165  | br. m.                  |
| 1792                             | Mar. 2  | 25 15 00  | 116 00 00 | 64           | 64            | 34.9         | 2,131  | br. oz.                 |
| 1793                             | Mar. 2  | 25 05 00  | 115 50 00 | 66           | 64            | 35.4         | 1,343  | br. m. s.               |
| 1794                             | Mar. 2  | 24 53 05  | 115 51 45 | 64           | 65            | 64.4         | 55     | g. coralline.           |
| 1795                             | Mar. 2  | 24 54 00  | 115 43 00 | 64           | 65            | 40.5         | 493    | r. bk. s.               |
| 1796                             | Mar. 2  | 24 51 00  | 115 43 00 | 65           | 65            | 35.4         | 1,312  | br. m. s.               |
| 1797                             | Mar. 2  | 24 35 00  | 115 41 00 | 67           | 66            | 34.9         | 2,131  | no specimen.            |
| 1798                             | Mar. 2  | 23 46 00  | 115 34 00 | 66           | 65            | 35           | 2,119  | br. m.                  |
| 1799                             | Mar. 3  | 22 57 00  | 115 25 00 | 67           | 66            | 34.9         | 2,167  | br. oz.                 |
| 1800                             | Mar. 3  | 22 07 30  | 115 13 00 | 67           | 68            | 35           | 2,280  | br. m.                  |
| 1801                             | Mar. 3  | 21 17 30  | 115 04 00 | 72           | 71            | 35           | 1,845  | br. m.                  |
| 1802                             | Mar. 3  | 20 26 00  | 114 58 00 | 68           | 69            | 35           | 2,072  | br. oz.                 |
| 1803                             | Mar. 4  | 19 35 00  | 114 52 00 | 67           | 69            | 34.9         | 2,032  | br. m.                  |
| 1804                             | Mar. 4  | 18 44 00  | 114 45 00 | 70           | 70            | 35           | 1,925  | fne. bk. s.             |
| 1805                             | Mar. 4  | 18 33 30  | 114 44 00 | 72           | 71            | 35           | 1,732  | gy. s. g.               |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.                        |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|----------------------------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.                          | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Off west coast of Mexico.        |           |              |               |              |        |                      |
|            | 1889.   | ° ' "                            | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1806       | Mar. 4  | 18 25 30                         | 114 41 00 | 71           | 71            | 46.4         | 281    | bk. s.               |
| 1807       | Mar. 6  | 18 23 00                         | 114 36 00 | 71           | 70            | 39.8         | 651    | bk. and co. s. glob. |
| 1808       | Mar. 6  | 18 23 00                         | 114 18 15 | 71           | 74            | 35.3         | 1,987  | br. m.               |
| 1809       | Mar. 7  | 18 23 30                         | 113 48 00 | 70           | 72            | 35.1         | 2,008  | br. m.               |
| 1810       | Mar. 7  | 18 24 30                         | 113 15 00 | 69           | 72            | 36.7         | 2,012  | br. m.               |
| 1811       | Mar. 7  | 18 25 00                         | 112 44 00 | 71           | 73            | 35.3         | 1,951  | br. m.               |
| 1812       | Mar. 7  | 18 28 30                         | 112 12 00 | 75           | 74            | 35.4         | 1,854  | br. m.               |
| 1813       | Mar. 7  | 18 32 00                         | 111 41 00 | 70           | 72            | -----        | 1,829  | br. m.               |
| 1814       | Mar. 7  | 18 35 00                         | 111 21 00 | 70           | 71            | 35.3         | 1,786  | br. m.               |
| 1815       | Mar. 7  | 18 38 00                         | 111 11 00 | 70           | 70            | 35.3         | 1,823  | r.                   |
| 1816       | Mar. 7  | 18 39 00                         | 111 07 00 | 69           | 70            | 35.5         | 1,619  | rky.                 |
| 1817       | Mar. 8  | 18 39 45                         | 111 02 00 | 70           | 70            | 36.2         | 1,161  | rky.                 |
| 1818       | Mar. 8  | 18 40 45                         | 110 58 30 | 70           | 70            | 39.4         | 651    | rky.                 |
| 1819       | Mar. 10 | 18 53 00                         | 110 51 00 | 70           | 70            | 35.8         | 1,264  | br. m. bk. s.        |
| 1820       | Mar. 10 | 19 03 00                         | 110 50 30 | 71           | 70            | 35.6         | 1,635  | br. m.               |
| 1821       | Mar. 10 | 19 12 00                         | 110 50 00 | 71           | 72            | 37.5         | 910    | br. m.               |
| 1822       | Mar. 10 | 19 15 30                         | 110 49 15 | 71           | 73            | 50.3         | 210    | rky.                 |
| 1823       | Mar. 10 | 19 21 30                         | 110 47 00 | 73           | 73            | 44           | 375    | bk. s.               |
| 1824       | Mar. 10 | 19 26 15                         | 110 45 30 | 72           | 73            | 39.2         | 665    | r.                   |
| 1825       | Mar. 10 | 19 40 15                         | 110 41 15 | 72           | 73            | 35.5         | 1,807  | br. m.               |
| 1826       | Mar. 10 | 20 09 00                         | 110 32 30 | 70           | 70            | 35.5         | 1,643  | br. m.               |
| 1827       | Mar. 11 | 20 55 15                         | 110 18 30 | 69           | 70            | 35.5         | 1,761  | dk. br. m.           |
| 1828       | Mar. 11 | 21 41 00                         | 110 04 30 | 72           | 74            | 35.4         | 1,694  | gn. m.               |
| 1829       | Mar. 11 | 22 25 30                         | 109 42 15 | 69           | 71            | 35.5         | 1,711  | gn. m.               |
| 1830       | Mar. 20 | 27 37 15                         | 111 09 00 | 70           | 66            | 39.8         | 601    | gn. m.               |
| 1831       | Mar. 24 | 28 44 15                         | 112 32 15 | 64           | 61            | 64.2         | 89     | s. brk. sh.          |
| 1832       | Mar. 27 | 31 23 00                         | 114 25 00 | 66           | 65            | 65           | 10     | m. s.                |
| 1833       | Mar. 27 | 31 13 30                         | 114 27 15 | 66           | 63.9          | 63.9         | 18     | m.                   |
|            |         | Off west coast of United States. |           |              |               |              |        |                      |
| 1834       | June 7  | 46 45 30                         | 124 36 00 | 56           | 56            | 45.7         | 55     | fne. gy. s.          |
| 1835       | June 7  | 46 44 45                         | 124 32 45 | 56           | 56            | 45.1         | 58     | rky.                 |
| 1836       | June 8  | 44 04 00                         | 124 53 30 | 54           | 52            | 48.6         | 48     | bu. m.               |
| 1837       | June 8  | 43 54 30                         | 124 47 30 | 59           | 57            | 43.9         | 95     | m.                   |
| 1838       | June 8  | 43 57 30                         | 124 49 00 | 59           | 57            | 47.3         | 61     | m. and g.            |
| 1839       | June 8  | 44 59 30                         | 124 50 30 | 57           | 56            | 52.1         | 43     | m. and g.            |
| 1840       | June 8  | 44 09 30                         | 124 51 30 | 57           | 56            | 43.6         | 95     | fne. bk. s.          |
| 1841       | June 8  | 44 11 15                         | 124 48 15 | 57           | 56            | -----        | 68     | g.                   |
| 1842       | June 8  | 44 16 00                         | 124 42 00 | 56           | 56            | 45.9         | 70     | g.                   |
| 1843       | June 8  | 44 19 00                         | 124 40 00 | 57           | 55            | 46.4         | 61     | g.                   |
| 1844       | June 8  | 44 22 15                         | 124 38 00 | 57           | 55            | -----        | 60     | m. and g.            |
| 1845       | June 8  | 44 25 30                         | 124 36 00 | 57           | 55            | 47.2         | 73     | fne. gy. s.          |
| 1846       | June 9  | 44 28 30                         | 124 34 00 | 57           | 55            | 45.6         | 78     | fne. bk. s.          |
| 1847       | June 9  | 44 31 15                         | 124 31 45 | 56           | 56            | 45.1         | 75     | gl.                  |
| 1848       | June 9  | 44 34 30                         | 124 29 15 | 56           | 56            | 45.8         | 60     | rky.                 |
| 1849       | June 9  | 44 37 30                         | 124 27 00 | 57           | 57            | 46.6         | 59     | fne. p. and bk. s.   |
| 1850       | June 9  | 44 40 15                         | 124 25 00 | 57           | 57            | 46.6         | 57     | fne. bk. s.          |
| 1851       | June 9  | 44 43 30                         | 124 22 30 | 56           | 57            | 46.6         | 65     | fne. gy. s.          |
| 1852       | June 9  | 44 41 00                         | 124 16 15 | 56           | 57            | 46.1         | 45     | fne. gy. s. bk. sp.  |
| 1853       | June 9  | 44 39 00                         | 124 11 00 | 55           | 57            | 46.1         | 34     | fne. gy. s.          |
| 1854       | June 13 | 45 55 30                         | 124 01 15 | 56           | 54            | 48.6         | 25     | fne. gy. s.          |
| 1855       | June 14 | 48 29 00                         | 124 55 15 | 56           | 54            | 46.6         | 45     | rky. and g.          |
| 1856       | June 14 | 48 29 30                         | 124 56 30 | 56           | 54            | 47.1         | 31     | g. and brk. sh.      |
| 1857       | June 29 | 47 23 00                         | 125 44 00 | 57           | 54            | 36.7         | 860    | gn. m.               |
| 1858       | Aug. 28 | 45 52 00                         | 124 10 30 | 60           | 59            | 45.6         | 53     | fne. gy. s.          |
| 1859       | Aug. 29 | 45 51 30                         | 124 17 00 | 60           | 58            | 45.6         | 73     | fne. gy. s. bk. sp.  |
| 1860       | Aug. 29 | 45 50 45                         | 124 23 30 | 60           | 58            | 45.8         | 83     | fne. gy. s. m.       |
| 1861       | Aug. 29 | 45 50 15                         | 124 29 30 | 59           | 58            | 45.3         | 87     | fne. gy. s. m.       |
| 1862       | Aug. 29 | 45 49 45                         | 124 36 00 | 59           | 58            | 45.1         | 81     | c.                   |
| 1863       | Aug. 29 | 45 49 15                         | 124 43 00 | 59           | 59            | 44.6         | 120    | fne. gy. s.          |
| 1864       | Aug. 29 | 45 39 00                         | 124 40 00 | 59           | 59            | 43.5         | 186    | m.                   |
| 1865       | Aug. 29 | 45 38 30                         | 124 32 30 | 60           | 59            | 45           | 123    | m.                   |
| 1866       | Aug. 29 | 45 38 30                         | 124 25 00 | 60           | 59            | 45.3         | 91     | m.                   |
| 1867       | Aug. 29 | 45 38 00                         | 124 17 30 | 60           | 60            | 45.2         | 81     | m. and fne. gy. s.   |
| 1868       | Aug. 29 | 45 38 00                         | 124 10 00 | 61           | 60            | 45.7         | 58     | fne. gy. s.          |
| 1869       | Aug. 29 | 45 37 30                         | 124 04 00 | 61           | 60            | 47.4         | 42     | fne. gy. s. and sh.  |
| 1870       | Aug. 29 | 45 33 30                         | 124 03 30 | 61           | 60            | 47.2         | 45     | fne. gy. s.          |
| 1871       | Aug. 29 | 45 29 00                         | 124 04 00 | 60           | 60            | 46.7         | 48     | fne. gy. s.          |
| 1872       | Aug. 29 | 45 28 30                         | 124 10 45 | 61           | 62            | 45.6         | 73     | fne. gy. s.          |
| 1873       | Aug. 29 | 45 28 30                         | 124 17 30 | 62           | 62            | 45.3         | 94     | gn. m.               |
| 1874       | Aug. 29 | 45 28 30                         | 124 25 00 | 62           | 61            | 45.1         | 120    | gy. s. bk. sp.       |
| 1875       | Aug. 29 | 45 28 30                         | 124 32 00 | 62           | 61            | 42.4         | 259    | gn. m.               |
| 1876       | Aug. 29 | 45 23 45                         | 124 32 00 | 63           | 62            | 42.8         | 216    | gn. m.               |
| 1877       | Aug. 29 | 45 18 30                         | 124 32 15 | 64           | 66            | 42.6         | 238    | yl. m.               |
| 1878       | Aug. 29 | 45 18 00                         | 124 25 15 | 64           | 66            | 42.8         | 217    | m.                   |
| 1879       | Aug. 29 | 45 17 30                         | 124 17 30 | 67           | 66            | 44.4         | 130    | m.                   |
| 1880       | Aug. 29 | 45 17 30                         | 124 12 00 | 68           | 64            | 45.6         | 88     | gn. m.               |
| 1881       | Aug. 29 | 45 17 30                         | 124 05 00 | 68           | 64            | 46.1         | 52     | fne. gy. s.          |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.                           |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|-------------------------------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.                             | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Off west coast of<br>United States. |           |              |               |              |        |                      |
|            | 1889.   | ° ' "                               | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 1882       | Aug. 29 | 45 12 30                            | 124 05 45 | 63           | 61            | 45.9         | 49     | fne. gy. s.          |
| 1883       | Aug. 29 | 45 07 30                            | 124 06 00 | 62           | 61            | 46.8         | 48     | fne. gy. s.          |
| 1884       | Aug. 29 | 45 07 00                            | 124 13 00 | 62           | 61            | 45.6         | 85     | gy. s. bk. sp.       |
| 1885       | Aug. 29 | 45 06 45                            | 124 19 45 | 62           | 60            | 44.8         | 119    | gn. m.               |
| 1886       | Aug. 29 | 45 06 30                            | 124 27 15 | 62           | 60            | 43.4         | 190    | gn. m.               |
| 1887       | Aug. 29 | 45 06 15                            | 124 34 30 | 62           | 60            | 43.4         | 191    | gn. m.               |
| 1888       | Aug. 30 | 45 01 00                            | 124 35 00 | 62           | 62            | 42.6         | 245    | m.                   |
| 1889       | Aug. 30 | 44 55 00                            | 124 36 00 | 62           | 62            | 43.5         | 203    | m.                   |
| 1890       | Aug. 30 | 44 54 30                            | 124 29 15 | 62           | 62            | 45.4         | 100    | m.                   |
| 1891       | Aug. 30 | 44 54 00                            | 124 22 30 | 62           | 61            | -----        | 79     | m.                   |
| 1892       | Aug. 30 | 44 53 30                            | 124 15 30 | 62           | 61            | 45.7         | 63     | m. and s.            |
| 1893       | Aug. 30 | 44 53 00                            | 124 09 00 | 62           | 61            | 47.7         | 35     | fne. gy. s.          |
| 1894       | Aug. 30 | 44 47 30                            | 124 08 15 | 62           | 61            | 48           | 33     | fne. gy. s.          |
| 1895       | Aug. 30 | 44 43 15                            | 124 09 00 | 62           | 61            | 47.9         | 33     | fne. gy. s.          |
| 1896       | Aug. 30 | 44 43 00                            | 124 16 30 | 60           | 61            | 47.7         | 46     | fne. gy. s.          |
| 1897       | Aug. 30 | 44 43 00                            | 124 23 45 | 60           | 60            | 45.8         | 64     | fne. gy. s.          |
| 1898       | Aug. 30 | 44 43 00                            | 124 30 30 | 60           | 60            | 45.5         | 87     | fne. gy. s.          |
| 1899       | Aug. 30 | 44 43 00                            | 124 43 00 | 60           | 60            | 44.2         | 156    | fne. gy. s. bk. sp.  |
| 1900       | Aug. 30 | 44 43 00                            | 124 46 00 | 61           | 61            | 41.7         | 217    | yl. m.               |
| 1901       | Aug. 30 | 44 38 00                            | 124 46 30 | 62           | 61            | 44.7         | 139    | bk. s.               |
| 1902       | Aug. 30 | 44 38 00                            | 124 54 00 | 62           | 61            | 40.9         | 311    | gn. m.               |
| 1903       | Aug. 30 | 44 33 00                            | 124 54 30 | 61           | 61            | 40.9         | 340    | fne. bk. s.          |
| 1904       | Aug. 30 | 44 33 30                            | 124 48 00 | 61           | 61            | 44.5         | 185    | gn. m.               |
| 1905       | Aug. 30 | 44 33 45                            | 123 41 30 | 60           | 61            | 44.8         | 123    | m.                   |
| 1906       | Aug. 30 | 44 34 00                            | 124 35 15 | 57           | 59            | 45.1         | 94     | m.                   |
| 1907       | Aug. 30 | 44 34 15                            | 124 28 30 | 56           | 59            | 46.1         | 60     | fne. bk. s.          |
| 1908       | Aug. 30 | 44 34 15                            | 124 23 30 | 56           | 59            | -----        | 60     | crs. s. brk. sh.     |
| 1909       | Aug. 30 | 44 34 30                            | 124 17 00 | 56           | 59            | 46.7         | 43     | fne. gy. s.          |
| 1910       | Aug. 30 | 44 30 30                            | 124 10 00 | 56           | 56            | 48.5         | 28     | fne. gy. s.          |
| 1911       | Aug. 30 | 44 30 00                            | 124 11 00 | 56           | 56            | 47.5         | 28     | fne. gy. s. bk. sp.  |
| 1912       | Aug. 30 | 44 25 30                            | 124 12 30 | 57           | 56            | 46.7         | 28     | fne. gy. s.          |
| 1913       | Aug. 30 | 44 26 00                            | 124 19 30 | 56           | 56            | 45.8         | 43     | fne. gy. s.          |
| 1914       | Aug. 30 | 44 26 30                            | 124 26 15 | 56           | 56            | 44.8         | 42     | rky.                 |
| 1915       | Aug. 30 | 44 27 00                            | 124 34 00 | 56           | 56            | 45.2         | 56     | crs. bk. s.          |
| 1916       | Aug. 30 | 44 27 30                            | 124 41 00 | 55           | 58            | 45.1         | 79     | fne. gy. s.          |
| 1917       | Aug. 31 | 44 28 00                            | 124 48 00 | 55           | 58            | 43.1         | 167    | g.                   |
| 1918       | Aug. 31 | 44 28 30                            | 124 54 45 | 56           | 57            | 41.3         | 265    | m.                   |
| 1919       | Aug. 31 | 44 23 15                            | 124 54 45 | 56           | 57            | 40.9         | 293    | m.                   |
| 1920       | Aug. 31 | 44 18 00                            | 124 54 45 | 56           | 58            | 41.3         | 282    | m.                   |
| 1921       | Aug. 31 | 44 18 00                            | 124 47 30 | 59           | 58            | 45.7         | 84     | bk. s.               |
| 1922       | Aug. 31 | 44 18 00                            | 124 41 00 | 56           | 57            | 46.4         | 51     | c.                   |
| 1923       | Aug. 31 | 44 18 15                            | 124 34 00 | 56           | 57            | 46.2         | 56     | bk. s. and g.        |
| 1924       | Aug. 31 | 44 18 15                            | 124 28 00 | 56           | 56            | 45.7         | 54     | gy. s. bk. sp.       |
| 1925       | Aug. 31 | 44 18 30                            | 124 21 00 | 56           | 56            | 46.5         | 45     | gy. s. bk. sp.       |
| 1926       | Aug. 31 | 44 18 30                            | 124 15 00 | 57           | 56            | 47.2         | 35     | gy. s. bk. sp.       |
| 1927       | Aug. 31 | 44 18 30                            | 124 12 30 | 57           | 56            | 47.7         | 31     | yl. s. bk. sp.       |
| 1928       | Aug. 31 | 44 13 30                            | 124 12 30 | 57           | 56            | 48.9         | 31     | fne. gy. s.          |
| 1929       | Aug. 31 | 44 07 30                            | 124 11 00 | 58           | 57            | 47.7         | 29     | fne. gy. s.          |
| 1930       | Aug. 31 | 44 07 00                            | 124 18 00 | 57           | 57            | 46.9         | 45     | fne. gy. s.          |
| 1931       | Aug. 31 | 44 06 30                            | 124 25 00 | 57           | 57            | 46.2         | 60     | m.                   |
| 1932       | Aug. 31 | 44 06 00                            | 124 31 30 | 57           | 57            | 45.9         | 69     | gn. m.               |
| 1933       | Aug. 31 | 44 06 00                            | 124 37 30 | 59           | 59            | 45.7         | 70     | gn. m.               |
| 1934       | Aug. 31 | 44 05 30                            | 124 44 15 | 59           | 59            | 46.1         | 63     | gn. m.               |
| 1935       | Aug. 31 | 44 05 30                            | 124 51 30 | 59           | 59            | 47.1         | 51     | br. c. and p.        |
| 1936       | Aug. 31 | 44 05 00                            | 124 56 00 | 59           | 59            | 40.9         | 346    | m.                   |
| 1937       | Aug. 31 | 43 59 30                            | 124 59 00 | 59           | 59            | 41.8         | 326    | fne. gy. s. bk. sp.  |
| 1938       | Aug. 31 | 43 53 00                            | 124 59 00 | 59           | 59            | 40.2         | 602    | gn. m.               |
| 1939       | Aug. 31 | 43 53 00                            | 124 56 00 | 68           | 63            | 40.4         | 365    | gn. m.               |
| 1940       | Aug. 31 | 43 52 45                            | 124 53 00 | 68           | 63            | 41.4         | 284    | gn. m.               |
| 1941       | Aug. 31 | 43 52 30                            | 124 50 00 | 68           | 63            | 42.8         | 175    | fne. bk. s.          |
| 1942       | Aug. 31 | 43 52 15                            | 124 47 00 | 61           | 61            | 43.7         | 159    | m. and bk. s.        |
| 1943       | Aug. 31 | 43 52 00                            | 124 44 00 | 61           | 61            | 43.7         | 159    | m.                   |
| 1944       | Aug. 31 | 43 52 00                            | 124 40 30 | 60           | 60            | 43.7         | 159    | m.                   |
| 1945       | Aug. 31 | 43 47 45                            | 124 37 00 | 60           | 60            | 43.7         | 185    | gn. m.               |
| 1946       | Aug. 31 | 43 43 30                            | 124 34 30 | 60           | 60            | 45.1         | 127    | gn. m.               |
| 1947       | Aug. 31 | 43 39 15                            | 124 30 30 | 60           | 60            | 45.7         | 97     | gn. m.               |
| 1948       | Aug. 31 | 43 35 30                            | 124 26 30 | 59           | 59            | 45.7         | 80     | gn. m.               |
| 1949       | Aug. 31 | 43 31 00                            | 124 24 15 | 59           | 59            | 45.8         | 66     | fne. gy. s.          |
| 1950       | Sept. 1 | 43 36 00                            | 124 22 30 | 59           | 59            | 45.2         | 65     | gn. m.               |
| 1951       | Sept. 1 | 43 40 15                            | 124 21 00 | 56           | 56            | 45.7         | 62     | gn. m.               |
| 1952       | Sept. 1 | 43 45 30                            | 124 19 00 | 55           | 55            | 46.4         | 57     | gn. m.               |
| 1953       | Sept. 1 | 43 38 00                            | 124 24 15 | 56           | 55            | 46.2         | 62     | bk. s. and m.        |
| 1954       | Sept. 1 | 43 50 30                            | 124 29 00 | 56           | 55            | 46.1         | 72     | m.                   |
| 1955       | Sept. 1 | 43 53 00                            | 124 34 00 | 56           | 55            | 45.7         | 92     | gn. m.               |
| 1956       | Sept. 1 | 43 55 30                            | 124 38 30 | 59           | 59            | 45.1         | 120    | gn. m.               |
| 1957       | Sept. 1 | 43 58 00                            | 124 44 00 | 59           | 59            | 45.5         | 87     | bk. s. and m.        |
| 1958       | Sept. 1 | 44 01 00                            | 124 49 15 | 61           | 59            | -----        | 58     | r.                   |
| 1959       | Sept. 1 | 44 02 00                            | 124 50 15 | 61           | 59            | 46.2         | 58     | r.                   |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.    | Position.                           |           | Temperature. |               |              | Depth. | Character of bottom.         |
|------------|----------|-------------------------------------|-----------|--------------|---------------|--------------|--------|------------------------------|
|            |          | Lat. N.                             | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                              |
|            |          | Off west coast of<br>United States. |           |              |               |              |        |                              |
|            | 1889.    | ° ' "                               | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                              |
| 1960       | Sept. 1  | 43 59 30                            | 124 49 30 | 60           | 59            | 45.7         | 77     | c.                           |
| 1961       | Sept. 1  | 43 59 30                            | 124 47 00 | 60           | 59            | 45.8         | 74     | c.                           |
| 1962       | Sept. 1  | 44 00 15                            | 124 49 30 | 60           | 59            | 45.7         | 75     | c.                           |
| 1963       | Sept. 1  | 44 01 00                            | 124 52 00 | 59           | 59            | 45.7         | 61     | r.                           |
| 1964       | Sept. 1  | 44 01 30                            | 124 54 30 | 59           | 59            | 45.8         | 74     | p.                           |
| 1965       | Sept. 1  | 43 59 15                            | 124 54 30 | 60           | 60            | 45.6         | 79     | rky.                         |
| 1966       | Sept. 1  | 43 58 00                            | 124 54 15 | 60           | 60            | 43.6         | 174    | gn. m. fne. gy. s.           |
| 1967       | Sept. 1  | 43 57 45                            | 124 52 30 | 60           | 60            | 45.5         | 88     | rky.                         |
| 1968       | Sept. 1  | 43 57 30                            | 124 50 30 | 60           | 60            | 45.2         | 92     | No bottom specimen.          |
| 1969       | Sept. 1  | 43 58 30                            | 124 50 00 | 62           | 59            | 45.7         | 79     | gn. m. and s.                |
| 1970       | Sept. 1  | 43 54 20                            | 124 49 15 | 62           | 60            | 43.7         | 155    | bk. s.                       |
| 1971       | Sept. 1  | 43 54 10                            | 124 47 30 | 62           | 62            | 43.9         | 139    | bk. s. and m.                |
| 1972       | Sept. 1  | 43 54 00                            | 124 46 00 | 62           | 62            | 44.7         | 124    | bk. s. and m.                |
| 1973       | Sept. 1  | 43 54 45                            | 124 46 40 | 62           | 62            | 45.5         | 90     | gn. m. and g.                |
| 1974       | Sept. 1  | 43 55 30                            | 124 45 20 | 62           | 62            | 45.7         | 78     | bk. s. and g.                |
| 1975       | Sept. 1  | 43 56 15                            | 124 45 00 | 60           | 59            | 45.7         | 70     | c. and g.                    |
| 1976       | Sept. 1  | 43 57 00                            | 124 44 30 | 60           | 59            | 45.7         | 70     | c.                           |
| 1977       | Sept. 1  | 43 57 45                            | 124 44 00 | 60           | 59            | 45.7         | 67     | gn. m. and g.                |
| 1978       | Sept. 1  | 43 58 30                            | 124 44 20 | 60           | 59            | 45.7         | 61     | rky. brk. sh.                |
| 1979       | Sept. 1  | 44 00 00                            | 124 45 00 | 60           | 59            | 47.2         | 52     | co.                          |
| 1980       | Sept. 2  | 44 00 00                            | 124 11 30 | 56           | 56            | -----        | 18     | fne. gy. s.                  |
| 1981       | Sept. 2  | 44 01 30                            | 124 11 30 | 58           | 59            | 48.8         | 24     | yl. s.                       |
| 1982       | Sept. 2  | 44 16 00                            | 124 12 00 | 60           | 59            | 47.7         | 31     | fne. gy. s.                  |
| 1983       | Sept. 2  | 44 16 30                            | 124 09 00 | 62           | 57            | -----        | 19     | fne. gy. s.                  |
| 1984       | Sept. 2  | 44 18 00                            | 124 08 30 | 62           | 56            | -----        | 12     | fne. gy. s.                  |
| 1985       | Sept. 2  | 44 20 00                            | 124 13 00 | 57           | 54            | 47.8         | 31     | wh. s. bk. sp. sh.           |
| 1986       | Sept. 3  | 44 37 00                            | 124 15 00 | 56           | 54            | 47.5         | 44     | gy. s.                       |
| 1987       | Sept. 3  | 44 35 00                            | 124 13 00 | 55           | 55            | 46.2         | 43     | fne. gy. s. and gn. m.       |
| 1988       | Sept. 3  | 44 33 00                            | 124 11 00 | 56           | 55            | 46.7         | 32     | bk. s.                       |
| 1989       | Sept. 3  | 44 28 30                            | 124 23 00 | 56           | 56            | 46.5         | 45     | c. and p.                    |
| 1990       | Sept. 3  | 44 27 00                            | 124 24 30 | 56           | 56            | 46.5         | 44     | c.                           |
| 1991       | Sept. 3  | 44 26 30                            | 124 26 00 | 56           | 56            | 46.3         | 43     | c.                           |
| 1992       | Sept. 3  | 44 28 00                            | 124 24 20 | 59           | 56            | 47.2         | 43     | rky.                         |
| 1993       | Sept. 3  | 44 39 00                            | 124 08 30 | 57           | 56            | 48.2         | 29     | fne. gy. s. bk. sp.          |
| 1994       | Sept. 3  | 44 41 00                            | 124 09 00 | 55           | 52            | 46.9         | 28     | fne. gy. s. bk. sp.          |
| 1995       | Sept. 7  | 45 46 15                            | 124 04 45 | 63           | 60            | 45.1         | 46     | fne. gy. s. and g.           |
| 1996       | Sept. 7  | 45 45 30                            | 124 02 30 | 60           | 56            | 45.3         | 40     | fne. gy. s.                  |
| 1997       | Sept. 7  | 45 44 30                            | 123 59 30 | 60           | 56            | -----        | 22     | fne. gy. s.                  |
| 1998       | Sept. 7  | 45 43 00                            | 123 58 15 | 62           | 56            | -----        | 15     | fne. gy. s.                  |
| 1999       | Sept. 8  | 45 31 15                            | 124 00 45 | 57           | 52            | 47.2         | 25     | fne. gy. s.                  |
| 2000       | Sept. 8  | 45 35 00                            | 123 58 15 | 57           | 52            | 48.4         | 18     | gy. s. rd. sp.               |
| 2001       | Sept. 8  | 45 30 00                            | 123 59 45 | 57           | 51            | 48.5         | 18     | fne. gy. s.                  |
| 2002       | Sept. 8  | 45 28 30                            | 124 00 00 | 57           | 53            | 48.2         | 16     | fne. gy. s.                  |
| 2003       | Sept. 8  | 45 26 30                            | 124 00 15 | 57           | 56            | 48           | 21     | rky.                         |
| 2004       | Sept. 8  | 45 23 00                            | 124 00 30 | 54           | 50            | -----        | 18     | fne. gy. s.                  |
| 2005       | Sept. 8  | 45 19 00                            | 124 02 30 | 54           | 50            | 46.7         | 39     | fne. gy. s.                  |
| 2006       | Sept. 8  | 45 19 00                            | 124 00 30 | 57           | 51            | 47.2         | 23     | fne. bk. s.                  |
| 2007       | Sept. 9  | 45 17 30                            | 124 00 30 | 51           | 48            | 47.7         | 19     | fne. gy. s. bk. sp.          |
| 2008       | Sept. 9  | 45 13 00                            | 124 00 30 | 51           | 48            | 47.7         | 27     | fne. gy. s.                  |
| 2009       | Sept. 9  | 45 11 30                            | 124 00 00 | 51           | 49            | -----        | 19     | fne. gy. s. yl. m.           |
| 2010       | Sept. 9  | 45 10 30                            | 123 59 45 | 52           | 48            | -----        | 15     | fne. bk. s.                  |
| 2011       | Sept. 9  | 45 11 00                            | 124 03 30 | 52           | 48            | 45.8         | 34     | fne. gy. s. bk. sp.          |
| 2012       | Sept. 9  | 45 12 00                            | 124 07 00 | 52           | 48            | 45.9         | 52     | fne. gy. s. bk. sp.          |
| 2013       | Sept. 9  | 45 13 00                            | 124 10 30 | 52           | 48            | 45.6         | 69     | fne. gy. s.                  |
| 2014       | Sept. 9  | 45 09 30                            | 124 10 45 | 55           | 50            | 45.4         | 69     | fne. gy. s.                  |
| 2015       | Sept. 9  | 45 07 30                            | 124 06 00 | 55           | 50            | 45.9         | 49     | crs. s.                      |
| 2016       | Sept. 9  | 45 07 15                            | 124 03 00 | 55           | 50            | 46.2         | 33     | fne. gy. s.                  |
| 2017       | Sept. 9  | 45 07 00                            | 124 00 30 | 55           | 50            | -----        | 15     | fne. gy. s.                  |
| 2018       | Sept. 9  | 45 04 00                            | 124 02 30 | 55           | 50            | -----        | 23     | fne. gy. s.                  |
| 2019       | Sept. 9  | 45 04 00                            | 124 06 15 | 52           | 48            | 46           | 51     | fne. gy. s.                  |
| 2020       | Sept. 9  | 45 04 00                            | 124 11 00 | 52           | 48            | 45.5         | 68     | fne. gy. s.                  |
| 2021       | Sept. 9  | 45 02 00                            | 124 13 00 | 54           | 57            | 45.2         | 71     | fne. gy. s. bk. sp.          |
| 2022       | Sept. 9  | 45 01 15                            | 124 07 00 | 55           | 50            | 46.2         | 52     | bk. s.                       |
| 2023       | Sept. 9  | 45 00 45                            | 124 03 45 | 55           | 50            | -----        | 27     | fne. gy. s.                  |
| 2024       | Sept. 9  | 45 00 30                            | 124 02 15 | 55           | 51            | -----        | 16     | fne. gy. s. bk. sp. brk. sh. |
| 2025       | Sept. 9  | 44 58 30                            | 124 04 00 | 55           | 49            | 47.7         | 19     | r. and sh.                   |
| 2026       | Sept. 10 | 44 03 45                            | 124 12 00 | 49           | 51            | -----        | 30     | fne. gy. s.                  |
| 2027       | Sept. 10 | 44 03 15                            | 124 16 30 | 49           | 51            | 46           | 42     | fne. gy. s. and sh.          |
| 2028       | Sept. 10 | 43 54 00                            | 124 11 00 | 49           | 51            | 47.1         | 13     | fne. gy. s.                  |
| 2029       | Sept. 10 | 43 49 00                            | 124 14 00 | 50           | 49            | 46.7         | 36     | fne. gy. s.                  |
| 2030       | Sept. 10 | 43 47 00                            | 124 12 00 | 52           | 49            | -----        | 13     | fne. gy. s.                  |
| 2031       | Sept. 10 | 43 42 30                            | 124 14 30 | 52           | 49            | -----        | 28     | fne. gy. s.                  |
| 2032       | Sept. 10 | 43 40 30                            | 124 15 00 | 57           | 50            | -----        | 28     | fne. gy. s.                  |
| 2033       | Sept. 10 | 43 37 00                            | 124 16 00 | 52           | 51            | 45.9         | 53     | fne. gy. s.                  |
| 2034       | Sept. 10 | 43 34 00                            | 124 16 30 | 53           | 49            | 46.7         | 40     | fne. gy. s.                  |
| 2035       | Sept. 10 | 43 31 00                            | 124 16 00 | 53           | 49            | -----        | 11     | fne. gy. s.                  |
| 2036       | Sept. 10 | 43 27 30                            | 124 18 00 | 52           | 50            | 48.2         | 23     | fne. gy. s.                  |
| 2037       | Sept. 10 | 43 23 30                            | 124 21 30 | 54           | 52            | -----        | 17     | fne. gy. s.                  |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.        | Position.                                   |           | Temperature. |               |              | Depth.      | Character of bottom. |
|------------|--------------|---|-----------|--------------|---------------|--------------|-------------|----------------------|
|            |              | Lat. N.                                     | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |             |                      |
|            |              | <i>Off west coast of<br/>United States.</i> |           |              |               |              |             |                      |
|            | <b>1889.</b> | ° ' "                                       | ° ' "     | ° F.         | ° F.          | ° F.         | <i>Fms.</i> |                      |
| 2038       | Sept. 10     | 43 19 00                                    | 124 25 30 | 54           | 52            | 48.7         | 28          | fne. gy. s.          |
| 2039       | Sept. 10     | 43 13 00                                    | 124 26 00 | 55           | 52            | 47.7         | 27          | fne. gy. s.          |
| 2040       | Sept. 10     | 43 08 30                                    | 124 28 00 | 55           | 52            | 46.1         | 25          | rky. co.             |
| 2041       | Sept. 10     | 43 09 00                                    | 124 35 00 | 57           | 50            | 45.8         | 64          | p.                   |
| 2042       | Sept. 10     | 43 09 30                                    | 124 42 00 | 55           | 51            | 44.7         | 134         | fne. gy. s.          |
| 2043       | Sept. 10     | 43 10 00                                    | 124 49 00 | 54           | 52            | 44.7         | 165         | bk. s.               |
| 2044       | Sept. 10     | 43 14 15                                    | 124 52 00 | 54           | 54            | 42.2         | 234         | bk. s.               |
| 2045       | Sept. 11     | 43 17 30                                    | 124 55 30 | 56           | 57            | 40.1         | 384         | gn. m.               |
| 2046       | Sept. 11     | 43 17 00                                    | 124 42 00 | 59           | 59            | 44.9         | 116         | gn. m.               |
| 2047       | Sept. 11     | 43 17 00                                    | 124 34 30 | 55           | 59            | 46           | 64          | c.                   |
| 2048       | Sept. 11     | 43 21 00                                    | 124 27 00 | 51           | 51            | 45.8         | 46          | fne. gy. s.          |
| 2049       | Sept. 11     | 43 23 00                                    | 124 35 00 | 51           | 51            | 45.7         | 68          | c.                   |
| 2050       | Sept. 11     | 43 24 00                                    | 124 42 00 | 51           | 51            | 45.3         | 119         | gn. m.               |
| 2051       | Sept. 11     | 43 25 30                                    | 124 48 30 | 53           | 54            | 41.1         | 326         | gn. m.               |
| 2052       | Sept. 11     | 43 20 30                                    | 124 49 00 | 53           | 54            | 41.7         | 306         | bk. s. and m.        |
| 2053       | Sept. 11     | 43 16 00                                    | 124 48 00 | 55           | 54            | 42.7         | 233         | gn. m.               |
| 2054       | Sept. 11     | 43 12 00                                    | 124 47 30 | 56           | 54            | 44.2         | 188         | gn. m.               |
| 2055       | Sept. 11     | 43 06 30                                    | 124 47 00 | 56           | 54            | 45.2         | 141         | fne. bk. s.          |
| 2056       | Sept. 11     | 43 06 30                                    | 124 40 00 | 56           | 53            | 45.7         | 91          | gn. m.               |
| 2057       | Sept. 11     | 43 06 30                                    | 124 32 00 | 56           | 53            | 45.9         | 58          | gn. m.               |
| 2058       | Sept. 11     | 42 59 00                                    | 124 36 00 | 56           | 53            | 45.9         | 49          | fne. gy. s.          |
| 2059       | Sept. 11     | 42 58 30                                    | 124 44 00 | 55           | 49            | 45.9         | 76          | gn. m.               |
| 2060       | Sept. 11     | 42 58 00                                    | 124 52 30 | 53           | 51            | 45.5         | 120         | gn. m.               |
| 2061       | Sept. 11     | 42 58 00                                    | 124 00 00 | 53           | 51            | 40.9         | 407         | gn. m.               |
| 2062       | Sept. 11     | 42 49 30                                    | 124 00 00 | 53           | 51            | 39.9         | 382         | gn. m. and p.        |
| 2063       | Sept. 11     | 42 48 30                                    | 124 53 00 | 53           | 51            | 44.8         | 140         | rky.                 |
| 2064       | Sept. 11     | 42 49 00                                    | 124 46 00 | 54           | 50            | 45.7         | 114         | fne. gy. s.          |
| 2065       | Sept. 11     | 42 59 30                                    | 124 40 30 | 53           | 49            | 46.7         | 47          | fne. gy. s. bk. sp.  |
| 2066       | Sept. 12     | 43 03 30                                    | 124 33 30 | 50           | 48            | 45.8         | 44          | g.                   |
| 2067       | Sept. 12     | 43 04 30                                    | 124 26 30 | 50           | 47            | 46.2         | 21          | fne. gy. s.          |
| 2068       | Sept. 12     | 43 08 00                                    | 124 27 30 | 50           | 48            | -----        | 25          | rky.                 |
| 2069       | Sept. 12     | 43 00 00                                    | 124 27 30 | 50           | 48            | 47.2         | 17          | fne. gy. s.          |
| 2070       | Sept. 12     | 42 55 00                                    | 124 32 30 | 50           | 48            | 46.1         | 28          | fne. gy. s.          |
| 2071       | Sept. 12     | 42 53 00                                    | 124 34 00 | 52           | 47            | -----        | 17          | fne. gy. s.          |
| 2072       | Sept. 12     | 42 51 15                                    | 124 37 00 | 52           | 47            | 47.7         | 34          | fne. gy. s.          |
| 2073       | Sept. 12     | 42 48 15                                    | 124 37 45 | 51           | 47            | -----        | 29          | fne. gy. s.          |
| 2074       | Sept. 12     | 42 46 45                                    | 124 38 00 | 53           | 48            | -----        | 44          | r. and brk. sh.      |
| 2075       | Sept. 12     | 42 45 30                                    | 124 38 15 | 53           | 48            | 46.8         | 34          | st. and brk. sh.     |
| 2076       | Sept. 12     | 42 44 15                                    | 124 33 00 | 54           | 48            | 47.5         | 23          | fne. gy. s.          |
| 2077       | Sept. 13     | 42 42 30                                    | 124 30 30 | 56           | 48            | 47.7         | 26          | bk. s.               |
| 2078       | Sept. 13     | 42 43 00                                    | 124 37 00 | 56           | 48            | 45.7         | 62          | fne. gy. s.          |
| 2079       | Sept. 13     | 42 43 00                                    | 124 42 00 | 50           | 48            | 44.7         | 161         | fne. gy. s.          |
| 2080       | Sept. 13     | 42 42 00                                    | 124 50 00 | 50           | 48            | 40.8         | 329         | gn. m.               |
| 2081       | Sept. 13     | 42 35 30                                    | 124 50 00 | 53           | 49            | 39.3         | 492         | gn. m.               |
| 2082       | Sept. 13     | 42 35 30                                    | 124 42 30 | 53           | 49            | 45.7         | 151         | gn. m.               |
| 2083       | Sept. 13     | 42 35 00                                    | 124 35 30 | 53           | 49            | 46.7         | 61          | br. m.               |
| 2084       | Sept. 13     | 42 34 30                                    | 124 29 00 | 52           | 49            | 46.5         | 34          | fne. gy. s.          |
| 2085       | Sept. 13     | 42 28 30                                    | 124 33 00 | 51           | 49            | 46.8         | 35          | fne. gy. s.          |
| 2086       | Sept. 13     | 42 20 00                                    | 124 40 00 | 51           | 49            | 46.9         | 63          | fne. gy. s.          |
| 2087       | Sept. 13     | 42 29 00                                    | 124 46 30 | 51           | 48            | 43.8         | 206         | c.                   |
| 2088       | Sept. 13     | 42 22 00                                    | 124 51 00 | 52           | 48            | 39.2         | 505         | bk. s. g.            |
| 2089       | Sept. 13     | 42 21 00                                    | 124 44 00 | 52           | 48            | 42.7         | 236         | bk. s.               |
| 2090       | Sept. 13     | 42 21 00                                    | 124 36 00 | 52           | 48            | 45.4         | 79          | gn. m.               |
| 2091       | Sept. 13     | 42 21 00                                    | 124 33 00 | 52           | 48            | 45.5         | 62          | gn. m.               |
| 2092       | Sept. 14     | 43 23 30                                    | 124 24 00 | 53           | 51            | 46.8         | 40          | fne. gy. s.          |
| 2093       | Sept. 14     | 43 25 00                                    | 124 27 00 | 53           | 51            | 46.2         | 59          | fne. gy. s.          |
| 2094       | Sept. 14     | 43 28 30                                    | 124 32 30 | 54           | 52            | 45.7         | 79          | fne. gy. s.          |
| 2095       | Sept. 14     | 43 32 00                                    | 124 37 30 | 55           | 53            | 44.2         | 157         | gn. m.               |
| 2096       | Sept. 14     | 43 35 30                                    | 124 42 30 | 56           | 56            | 41.2         | 277         | gn. m.               |
| 2097       | Oct. 12      | 42 25 00                                    | 124 32 30 | 58           | 57            | 51.8         | 39          | fne. gy. s.          |
| 2098       | Oct. 12      | 42 22 30                                    | 124 32 30 | 58           | 57            | 51.8         | 44          | fne. gy. s.          |
| 2099       | Oct. 12      | 42 13 30                                    | 124 27 30 | 61           | 59            | 52           | 51          | bk. s.               |
| 2100       | Oct. 12      | 42 14 00                                    | 124 34 00 | 61           | 59            | 47.7         | 94          | fne. gy. s.          |
| 2101       | Oct. 12      | 42 14 00                                    | 124 41 00 | 58           | 59            | 42           | 273         | m.                   |
| 2102       | Oct. 12      | 42 05 30                                    | 124 37 30 | 60           | 59            | -----        | 244         | No bottom obtained.  |
| 2103       | Oct. 12      | 42 04 30                                    | 124 31 00 | 60           | 59            | 49.5         | 65          | bk. s. and m.        |
| 2104       | Oct. 12      | 42 03 30                                    | 124 23 00 | 61           | 60            | 51.8         | 46          | fne. gy. s. and m.   |
| 2105       | Oct. 12      | 42 00 30                                    | 124 20 00 | 66           | 62            | 54.2         | 21          | fne. dk. gy. s.      |
| 2106       | Oct. 12      | 41 58 30                                    | 124 17 00 | 67           | 61            | 53.8         | 18          | fne. dk. gy. s.      |
| 2107       | Oct. 12      | 41 58 00                                    | 124 22 30 | 64           | 60            | 51.8         | 43          | gn. m.               |
| 2108       | Oct. 12      | 41 58 00                                    | 124 29 00 | 58           | 59            | 48.9         | 68          | gn. m.               |
| 2109       | Oct. 12      | 41 58 00                                    | 124 36 00 | 58           | 59            | 42.2         | 261         | gn. m.               |
| 2110       | Oct. 12      | 41 52 00                                    | 124 36 00 | 58           | 59            | 40.9         | 336         | gn. m.               |
| 2111       | Oct. 12      | 41 50 30                                    | 124 30 00 | 59           | 59            | 46.7         | 120         | gn. m.               |
| 2112       | Oct. 12      | 41 50 00                                    | 124 26 00 | 59           | 59            | 50.7         | 59          | bk. s.               |
| 2113       | Oct. 12      | 41 44 30                                    | 124 26 00 | 58           | 57            | 47.7         | 80          | gn. m.               |
| 2114       | Oct. 12      | 41 45 00                                    | 124 32 00 | 58           | 57            | 42.2         | 256         | gn. m.               |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.                       | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|----------------------------------|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|                                  |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Off west coast of United States. |         |           |           |              |               |              |        |                      |
| 1889.                            |         |           |           |              |               |              |        |                      |
| 2115                             | Oct. 12 | 41 38 30  | 124 31 30 | 58           | 57            | 42.7         | 277    | gn. m.               |
| 2116                             | Oct. 13 | 41 38 00  | 124 25 00 | 58           | 57            | 49.3         | 70     | gn. m.               |
| 2117                             | Oct. 13 | 41 38 00  | 124 17 30 | 57           | 56            | 52.3         | 38     | m.                   |
| 2118                             | Oct. 13 | 41 38 00  | 124 12 30 | 57           | 56            | 54           | 25     | m.                   |
| 2119                             | Oct. 13 | 41 32 00  | 124 13 30 | 57           | 55            | 53.8         | 27     | dk. gy. s.           |
| 2120                             | Oct. 13 | 41 32 00  | 124 19 00 | 57           | 55            | 51.9         | 42     | m.                   |
| 2121                             | Oct. 13 | 41 32 00  | 124 24 00 | 57           | 55            | 49.3         | 58     | m.                   |
| 2122                             | Oct. 13 | 41 32 00  | 124 30 00 | 56           | 55            | 47.9         | 94     | m.                   |
| 2123                             | Oct. 13 | 41 32 00  | 124 35 00 | 56           | 55            | 39.6         | 412    | c.                   |
| 2124                             | Oct. 13 | 41 26 15  | 124 33 30 | 56           | 55            | 39.1         | 488    | gn. m.               |
| 2125                             | Oct. 13 | 41 26 15  | 124 27 00 | 56           | 56            | 48.7         | 80     | gn. m.               |
| 2126                             | Oct. 13 | 41 26 15  | 124 20 00 | 56           | 56            | 50.7         | 49     | gn. m.               |
| 2127                             | Oct. 13 | 41 26 15  | 124 13 30 | 56           | 56            | 51.8         | 38     | gn. m.               |
| 2128                             | Oct. 13 | 41 26 30  | 124 07 00 | 56           | 56            | 54.3         | 18     | fne. gy. s.          |
| 2129                             | Oct. 13 | 41 20 00  | 124 11 00 | 56           | 56            | 51.2         | 36     | brk. sh. and p.      |
| 2130                             | Oct. 13 | 41 20 00  | 124 17 30 | 56           | 56            | 49.9         | 52     | gn. m.               |
| 2131                             | Oct. 13 | 41 20 00  | 124 24 30 | 56           | 56            | 48.7         | 86     | gn. m.               |
| 2132                             | Oct. 13 | 41 20 00  | 124 31 30 | 58           | 58            | 39.8         | 373    | gn. m.               |
| 2133                             | Oct. 13 | 41 13 00  | 124 31 00 | 58           | 58            | 39.4         | 465    | gn. m.               |
| 2134                             | Oct. 13 | 41 12 30  | 124 23 30 | 58           | 58            | 45.3         | 167    | gn. m.               |
| 2135                             | Oct. 13 | 41 12 00  | 124 17 00 | 58           | 58            | 49.7         | 58     | gn. m.               |
| 2136                             | Oct. 13 | 41 12 30  | 124 11 00 | 57           | 56            | 54.6         | 29     | fne. gy. s. and p.   |
| 2137                             | Oct. 13 | 41 05 30  | 124 13 00 | 57           | 56            | 52.4         | 26     | fne. dk. gy. s.      |
| 2138                             | Oct. 13 | 41 04 30  | 124 19 00 | 57           | 56            | 53.8         | 75     | gn. m.               |
| 2139                             | Oct. 13 | 41 03 30  | 124 26 00 | 57           | 56            | 42.7         | 268    | gn. m.               |
| 2140                             | Oct. 13 | 40 57 15  | 124 25 30 | 57           | 56            | 44.1         | 182    | gn. m.               |
| 2141                             | Oct. 13 | 40 57 00  | 124 20 00 | 57           | 56            | 49           | 65     | gn. m.               |
| 2142                             | Oct. 13 | 40 56 00  | 124 14 00 | 57           | 56            | 53.8         | 30     | fne. gy. s.          |
| 2143                             | Oct. 13 | 40 50 15  | 124 15 00 | 57           | 52            | 50.2         | 36     | gn. m.               |
| 2144                             | Oct. 13 | 40 50 00  | 124 22 00 | 56           | 52            | 48.2         | 70     | gn. m.               |
| 2145                             | Oct. 13 | 40 50 00  | 124 28 00 | 55           | 52            | 42.1         | 254    | m.                   |
| 2146                             | Oct. 13 | 40 44 30  | 124 33 30 | 56           | 56            | 41.7         | 294    | m.                   |
| 2147                             | Oct. 13 | 40 43 00  | 124 27 00 | 56           | 56            | 49.2         | 50     | m.                   |
| 2148                             | Oct. 13 | 40 43 00  | 124 22 00 | 56           | 56            | 53.3         | 27     | m.                   |
| 2149                             | Oct. 13 | 40 37 30  | 124 25 00 | 56           | 55            | -----        | 23     | fne. dk. gy. s.      |
| 2150                             | Oct. 14 | 40 39 00  | 124 31 00 | 56           | 55            | 41.7         | 355    | m.                   |
| 2151                             | Oct. 14 | 40 32 00  | 124 34 00 | 56           | 55            | 48.9         | 65     | bk. s. and m.        |
| 2152                             | Oct. 14 | 40 29 00  | 124 40 00 | 56           | 55            | 38.7         | 627    | gn. m.               |
| 1890.                            |         |           |           |              |               |              |        |                      |
| 2153                             | Mar. 11 | 37 18 50  | 122 28 30 | 55           | 53            | 52.8         | 21     | fne. bk. s.          |
| 2154                             | Mar. 11 | 37 16 00  | 122 25 50 | 60           | 53            | -----        | 10     | brk. sh. r.          |
| 2155                             | Mar. 12 | 37 05 00  | 122 19 00 | 55           | 54            | -----        | 17     | rky. sh.             |
| 2156                             | Mar. 12 | 36 55 00  | 122 17 00 | 56           | 55            | 47.8         | 122    | bk. s. m.            |
| 2157                             | Mar. 15 | 36 58 00  | 122 21 00 | 57           | 55            | 47.6         | 97     | crs. bk. s. m        |
| 2158                             | Mar. 22 | 37 47 55  | 123 10 00 | 53           | 53            | 52           | 17     | sh.                  |
| 2159                             | Mar. 22 | 37 47 50  | 123 10 50 | 53           | 53            | 51.3         | 19     | rky.                 |
| 2160                             | Mar. 22 | 37 47 45  | 123 11 10 | 53           | 53            | 50.8         | 45     | sh. and rky.         |
| 2161                             | Mar. 22 | 37 47 35  | 123 11 00 | 53           | 53            | 51.4         | 29     | rky.                 |
| 2162                             | Mar. 22 | 37 47 30  | 123 19 00 | 52           | 53            | 42           | 324    | r. and c.            |
| 2163                             | Mar. 22 | 37 48 30  | 123 30 20 | 52           | 53            | 36.8         | 900    | gn. m.               |
| 2164                             | Mar. 24 | 38 00 00  | 123 22 20 | 51           | 51            | 49.7         | 60     | s. sh.               |
| 2165                             | Mar. 24 | 38 01 00  | 123 24 18 | 51           | 51            | 51.2         | 39     | r.                   |
| 2166                             | Mar. 24 | 38 01 05  | 123 24 55 | 51           | 51            | -----        | 35     | rky.                 |
| 2167                             | Mar. 24 | 38 01 10  | 123 25 40 | 52           | 52            | 51.3         | 37     | rky.                 |
| 2168                             | Mar. 24 | 38 01 15  | 123 26 15 | 52           | 52            | 51.3         | 30     | rky. co.             |
| 2169                             | Mar. 24 | 38 01 35  | 123 26 50 | 52           | 52            | -----        | 40     | rky.                 |
| 2170                             | Mar. 24 | 38 01 45  | 123 28 00 | 52           | 52            | -----        | 55     | crs. bk. s. brk. sh. |
| 2171                             | Mar. 24 | 38 00 45  | 123 28 30 | 52           | 52            | -----        | 65     | gy. s. g. brk. sh.   |
| 2172                             | Mar. 24 | 37 59 40  | 123 28 55 | 52           | 52            | -----        | 139    | g. brk. sh.          |
| 2173                             | Mar. 24 | 37 59 20  | 123 27 45 | 55           | 55            | -----        | 73     | r.                   |
| 2174                             | Mar. 24 | 37 58 55  | 123 26 35 | 55           | 55            | -----        | 56     | brk. sh.             |
| 2175                             | Mar. 24 | 37 58 50  | 123 26 10 | 55           | 55            | -----        | 34     | r. co.               |
| 2176                             | Mar. 24 | 38 00 40  | 123 25 55 | 54           | 55            | -----        | 33     | rky.                 |
| 2177                             | Mar. 24 | 38 02 45  | 123 27 35 | 54           | 55            | -----        | 44     | r. co.               |
| 2178                             | Mar. 24 | 38 02 25  | 123 26 20 | 54           | 55            | -----        | 42     | r. co.               |
| 2179                             | Mar. 24 | 38 02 00  | 123 25 05 | 54           | 55            | -----        | 47     | rky.                 |
| 2180                             | Mar. 24 | 38 01 40  | 123 23 50 | 54           | 55            | -----        | 57     | yl. s.               |
| 2181                             | Mar. 24 | 37 59 45  | 123 24 25 | 54           | 55            | -----        | 41     | yl. s.               |
| 2182                             | Mar. 24 | 37 58 45  | 123 25 00 | 57           | 55            | -----        | 39     | r. co. and s         |
| 2183                             | Mar. 24 | 37 57 45  | 123 25 15 | 57           | 55            | -----        | 45     | yl. s.               |
| 2184                             | Mar. 24 | 37 58 00  | 123 26 35 | 57           | 55            | -----        | 67     | r. yl. s.            |
| 2185                             | Mar. 24 | 37 58 20  | 123 27 45 | 57           | 55            | -----        | 231    | m.                   |
| 2186                             | Mar. 24 | 38 00 10  | 123 27 00 | 54           | 55            | -----        | 36     | r. co.               |
| 2187                             | Mar. 24 | 38 02 15  | 123 27 30 | 52           | 55            | -----        | 47     | rky.                 |
| 2188                             | Mar. 24 | 38 04 25  | 123 28 00 | 52           | 52            | -----        | 84     | g.                   |
| 2189                             | Mar. 24 | 38 06 15  | 123 29 00 | 52           | 52            | -----        | 180    | fne. gy. s bk. sp.   |
| 2190                             | Mar. 24 | 38 17 00  | 123 30 00 | 51           | 52            | 42.5         | 269    | gn. m.               |
| 2191                             | Mar. 24 | 38 15 40  | 123 31 30 | 51           | 52            | 42.9         | 246    | gn. m.               |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.                           |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|-------------------------------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.                             | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Off west coast of<br>United States. |           |              |               |              |        |                      |
|            | 1890.   | ° ' "                               | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2192       | Mar. 24 | 38 20 30                            | 123 32 50 | 51           | 52            | 44.9         | 186    | m.                   |
| 2193       | Mar. 24 | 38 25 10                            | 123 34 25 | 50           | 52            | 47.9         | 134    | m.                   |
| 2194       | Mar. 24 | 38 30 00                            | 123 35 40 | 50           | 52            | 47.1         | 121    | m.                   |
| 2195       | Mar. 24 | 38 34 50                            | 123 37 00 | 50           | 52            | 46.7         | 88     | m.                   |
| 2196       | Mar. 24 | 38 39 10                            | 123 38 30 | 50           | 52            |              | 78     | m.                   |
| 2197       | Mar. 24 | 38 44 00                            | 123 40 00 | 50           | 52            | 47.4         | 66     | m.                   |
| 2198       | Mar. 25 | 38 48 30                            | 123 42 00 | 50           | 52            | 47.9         | 58     | gn. m.               |
| 2199       | Mar. 25 | 38 52 50                            | 123 46 00 | 49           | 52            | 47.9         | 51     | rky.                 |
| 2200       | Mar. 25 | 38 57 10                            | 123 48 30 | 49           | 52            | 48.9         | 55     | bk. s.               |
| 2201       | Mar. 25 | 38 55 50                            | 123 52 00 | 49           | 51            | 47.9         | 67     | bk. s.               |
| 2202       | Mar. 25 | 38 53 30                            | 123 57 35 | 49           | 51            | 44.9         | 189    | br. m.               |
| 2203       | Mar. 25 | 38 48 00                            | 123 55 50 | 49           | 50            | 39.5         | 486    | m.                   |
| 2204       | Mar. 25 | 38 49 30                            | 123 52 20 | 49           | 51            | 47.3         | 91     | bk. s.               |
| 2205       | Mar. 25 | 38 51 00                            | 123 49 00 | 49           | 51            | 49.4         | 69     | m.                   |
| 2206       | Mar. 25 | 38 52 25                            | 123 45 30 | 49           | 50            |              | 49     | hrd. m.              |
| 2207       | Mar. 25 | 38 47 15                            | 123 40 30 | 50           | 51            | 48.3         | 55     | r. gn. m.            |
| 2208       | Mar. 25 | 38 46 00                            | 123 44 00 | 50           | 51            | 47.1         | 69     | gn. m. sh.           |
| 2209       | Mar. 25 | 38 44 30                            | 123 47 10 | 50           | 51            | 46.7         | 90     | bk. s.               |
| 2210       | Mar. 25 | 38 44 00                            | 123 49 00 | 50           | 51            | 45.4         | 143    | m.                   |
| 2211       | Mar. 25 | 38 43 20                            | 123 51 00 | 50           | 51            | 42.9         | 249    | m.                   |
| 2212       | Mar. 25 | 38 38 40                            | 123 46 30 | 51           | 51            |              | 314    | bk. s.               |
| 2213       | Mar. 25 | 38 39 30                            | 123 44 00 | 50           | 51            | 46.6         | 103    | bk. s.               |
| 2214       | Mar. 28 | 38 37 45                            | 123 30 00 | 48           | 51            |              | 58     | gn. m.               |
| 2215       | Mar. 28 | 38 35 45                            | 123 34 15 | 48           | 50            |              | 82     | gn. m.               |
| 2216       | Mar. 28 | 38 32 45                            | 123 39 30 | 49           | 50            | 46           | 128    | bk. s.               |
| 2217       | Mar. 28 | 38 31 30                            | 123 42 00 | 49           | 50            | 41.6         | 314    | gn. m.               |
| 2218       | Mar. 28 | 38 26 00                            | 123 37 00 | 51           | 51            | 43           | 273    | gn. m.               |
| 2219       | Mar. 28 | 38 27 00                            | 123 35 00 | 51           | 51            | 46.2         | 113    | bk. s.               |
| 2220       | Mar. 28 | 38 29 40                            | 123 29 45 | 51           | 51            | 48.4         | 82     | gy. s.               |
| 2221       | Mar. 28 | 38 32 00                            | 123 25 30 | 51           | 51            | 47.5         | 67     | br. m.               |
| 2222       | Mar. 28 | 38 32 50                            | 123 24 30 | 51           | 51            | 48           | 60     | br. m. r.            |
| 2223       | Mar. 28 | 38 28 30                            | 123 19 00 | 52           | 52            | 48.5         | 54     | br. m.               |
| 2224       | Mar. 28 | 38 25 40                            | 123 24 00 | 52           | 52            | 48.5         | 74     | bk. s.               |
| 2225       | Mar. 28 | 38 23 00                            | 123 29 00 | 52           | 52            | 47.5         | 107    | m.                   |
| 2226       | Mar. 28 | 38 20 00                            | 123 34 00 | 51           | 52            | 42.8         | 242    | m.                   |
| 2227       | Mar. 28 | 38 14 00                            | 123 36 00 | 52           | 52            | 39.3         | 518    | gn. m.               |
| 2228       | Mar. 28 | 38 18 15                            | 123 25 50 | 52           | 52            | 45.6         | 124    | gn. m.               |
| 2229       | Apr. 2  | 36 56 30                            | 122 24 40 | 51           | 52            | 43.6         | 208    | gn. m.               |
| 2230       | Apr. 3  | 36 51 40                            | 122 24 00 | 51           | 52            | 36.9         | 921    | br. m.               |
| 2231       | Apr. 3  | 36 47 30                            | 122 20 10 | 51           | 52            | 37           | 860    | br. m.               |
| 2232       | Apr. 3  | 36 43 20                            | 122 16 25 | 51           | 52            | 38.1         | 620    | br. m.               |
| 2233       | Apr. 3  | 36 39 20                            | 122 12 50 | 51           | 52            | 37.9         | 739    | m.                   |
| 2234       | Apr. 3  | 36 34 00                            | 122 07 30 | 51           | 52            | 37.4         | 958    | gn. m.               |
| 2235       | Apr. 3  | 36 33 30                            | 122 04 00 | 51           | 52            | 39           | 575    | gn. m.               |
| 2236       | Apr. 3  | 36 32 35                            | 122 02 00 | 51           | 52            | 39.9         | 450    | m.                   |
| 2237       | Apr. 3  | 36 32 30                            | 122 00 00 | 51           | 52            | 42.9         | 246    | gn. m.               |
| 2238       | Apr. 3  | 36 27 20                            | 121 58 00 | 52           | 51            | 46.9         | 59     | fne. gy. s.          |
| 2239       | Apr. 3  | 36 19 00                            | 122 00 00 | 53           | 52            | 46.5         | 62     | crs. s.              |
| 2240       | Apr. 3  | 36 19 20                            | 122 05 00 | 53           | 52            | 47.2         | 99     | g.                   |
| 2241       | Apr. 3  | 36 04 00                            | 121 45 20 | 53           | 53            | 40.1         | 426    | br. m.               |
| 2242       | Apr. 3  | 35 59 00                            | 121 40 20 | 52           | 53            | 40.1         | 426    | br. m.               |
| 2243       | Apr. 3  | 35 55 15                            | 121 37 20 | 52           | 53            | 41.7         | 342    | br. m.               |
| 2244       | Apr. 3  | 35 50 50                            | 121 33 00 | 52           | 54            | 43.5         | 240    | br. m.               |
| 2245       | Apr. 4  | 35 39 30                            | 121 28 00 | 53           | 54            | 42.5         | 271    | gn. m.               |
| 2246       | Apr. 4  | 35 36 05                            | 121 22 00 | 54           | 53            | 46.2         | 144    | gy. s.               |
| 2247       | Apr. 4  | 35 32 15                            | 121 16 00 | 55           | 52            | 44.2         | 198    | gn. m.               |
| 2248       | Apr. 5  | 35 30 50                            | 121 11 00 | 51           | 51            |              | 113    | m.                   |
| 2249       | Apr. 5  | 35 29 20                            | 121 13 20 | 50           | 51            | 43.9         | 191    | gn. m.               |
| 2250       | Apr. 5  | 35 18 50                            | 121 05 00 | 53           | 52            | 44.9         | 146    | gn. m.               |
| 2251       | Apr. 5  | 35 08 40                            | 121 02 00 | 56           | 54            | 43           | 224    | gn. m.               |
| 2252       | Apr. 5  | 35 09 50                            | 120 58 00 | 56           | 54            | 45           | 119    | gn. m. rky.          |
| 2253       | Apr. 5  | 35 04 00                            | 120 57 30 | 55           | 54            | 45           | 143    | gn. m.               |
| 2254       | Apr. 5  | 34 58 30                            | 120 58 00 | 54           | 53            | 44.7         | 182    | gn. m.               |
| 2255       | Apr. 5  | 34 51 40                            | 120 54 30 | 54           | 53            | 45.9         | 142    | gn. m.               |
| 2256       | Apr. 5  | 34 45 30                            | 120 55 00 | 54           | 54            | 46           | 133    | gn. m.               |
| 2257       | Apr. 5  | 34 46 00                            | 120 49 50 | 54           | 54            | 47.9         | 62     | r. m.                |
| 2258       | Apr. 5  | 34 46 15                            | 120 45 35 | 54           | 54            | 48.9         | 47     | gn. m. r.            |
| 2259       | Apr. 5  | 34 37 30                            | 120 45 00 | 54           | 54            | 49           | 44     | r. and m.            |
| 2260       | Apr. 6  | 34 36 00                            | 120 50 40 | 54           | 54            | 45.6         | 158    |                      |
| 2261       | Apr. 6  | 34 34 50                            | 120 50 05 | 54           | 54            | 42.3         | 274    | m. and s.            |
| 2262       | Apr. 6  | 34 29 25                            | 120 50 00 | 54           | 54            | 41.9         | 312    | gn. m.               |
| 2263       | Apr. 6  | 34 30 00                            | 120 47 25 | 54           | 54            | 42.2         | 242    | gn. m.               |
| 2264       | Apr. 6  | 34 30 40                            | 120 44 55 | 54           | 54            | 46.4         | 139    | m.                   |
| 2265       | Apr. 6  | 34 31 10                            | 120 43 20 | 53           | 52            | 48           | 67     | bk. s. m.            |
| 2266       | Apr. 6  | 34 31 50                            | 120 42 00 | 52           | 53            | 48.7         | 53     | bk. s. m.            |
| 2267       | Apr. 6  | 34 26 55                            | 120 40 20 | 53           | 52            | 46           | 174    | gn. m.               |
| 2268       | Apr. 6  | 36 00 09                            | 121 38 10 | 67           | 61            | 41.8         | 299    | gn. m. r.            |
| 2269       | Apr. 6  | 36 02 30                            | 121 41 00 | 67           | 61            | 43.8         | 346    | m.                   |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.                           |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|-------------------------------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.                             | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Off west coast of<br>United States. |           |              |               |              |        |                      |
|            | 1890.   | ° ' "                               | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2270       | Apr. 6  | 36 07 10                            | 121 43 00 | 63           | 56            | 42.9         | 228    | m. and g.            |
| 2271       | Apr. 6  | 36 09 40                            | 121 45 30 | 61           | 54            | 41.1         | 356    | m.                   |
| 2272       | Apr. 6  | 36 11 00                            | 121 47 00 | 61           | 54            | 44.7         | 183    | s. m.                |
| 2273       | Apr. 6  | 36 13 05                            | 121 52 15 | 61           | 55            | 46.7         | 101    | fne. gy. s.          |
| 2274       | Apr. 6  | 36 15 00                            | 121 57 50 | 60           | 54            | 49.3         | 36     | rky.                 |
| 2275       | Apr. 11 | 36 42 50                            | 122 04 10 | 55           | 53            | 38.1         | 881    | rky.                 |
| 2276       | Apr. 11 | 36 45 45                            | 122 04 40 | 54           | 52            | 39.3         | 519    | gn. m.               |
| 2277       | Apr. 11 | 36 45 40                            | 121 53 05 | 54           | 53            | 47.7         | 66     | bk. s. r.            |
|            |         | Bering Sea.                         |           |              |               |              |        |                      |
| 2278       | May 21  | 54 02 25                            | 162 50 30 | 44           | 44            | 39           | 271    | m. s. p.             |
| 2279       | May 22  | 54 15 00                            | 164 53 00 | 41           | 42            | 38.5         | 42     | r. brk. sh.          |
| 2280       | May 22  | 54 34 00                            | 165 37 00 | 39           | 43            | 38.5         | 178    | bk. s.               |
| 2281       | May 22  | 54 55 40                            | 166 06 00 | 38           | 42            | 38.2         | 80     | yl. m.               |
| 2282       | May 23  | 54 58 30                            | 166 24 30 | 39           | 43            | -----        | 81     | -----                |
| 2283       | May 23  | 55 00 50                            | 166 41 30 | 38           | 41            | -----        | 80     | m.                   |
| 2284       | May 23  | 55 00 00                            | 166 59 00 | 36           | 41            | -----        | 88     | sh.                  |
| 2285       | May 23  | 54 59 00                            | 167 17 00 | 36           | 41            | 38           | 117    | s. sh.               |
| 2286       | May 23  | 54 49 20                            | 167 10 00 | 38           | 43            | 38.6         | 186    | gn. m.               |
| 2287       | May 23  | 54 23 45                            | 166 38 30 | 38           | 43            | 38.2         | 320    | gn. m.               |
| 2288       | May 23  | 54 09 20                            | 166 28 00 | 38           | 42            | 37           | 593    | gn. m.               |
| 2289       | May 28  | 54 27 00                            | 165 18 00 | 42           | 44            | -----        | 99     | bk. s.               |
| 2290       | May 28  | 54 29 30                            | 165 10 00 | 42           | 43            | 38           | 47     | bk. s.               |
| 2291       | May 28  | 54 28 20                            | 165 08 00 | 42           | 45            | 39           | 45     | gy. s.               |
| 2292       | May 28  | 54 31 40                            | 165 09 00 | 42           | 43            | -----        | 32     | bk. s. brk. sh.      |
| 2293       | May 28  | 54 34 30                            | 164 55 45 | 41           | 42            | -----        | 24     | bk. s.               |
| 2294       | May 28  | 54 39 00                            | 164 51 00 | 41           | 42            | -----        | 30     | bk. s.               |
| 2295       | May 28  | 54 41 15                            | 164 48 30 | 41           | 42            | -----        | 28     | crs. s. g.           |
| 2296       | May 28  | 54 47 30                            | 164 46 00 | 41           | 42            | 40           | 34     | g.                   |
| 2297       | May 28  | 54 57 40                            | 164 36 50 | 41           | 42            | 41           | 31     | bk. p.               |
| 2298       | May 28  | 54 57 30                            | 164 31 20 | 40           | 44            | 41.5         | 18     | fne. bk. s.          |
| 2299       | May 29  | 54 54 45                            | 164 19 30 | 45           | 44            | -----        | 16     | bk. s.               |
| 2300       | May 29  | 54 59 00                            | 164 05 35 | 44           | 44            | 39.3         | 12     | rky.                 |
| 2301       | May 29  | 55 03 10                            | 163 49 30 | 44           | 44            | 41           | 15     | fne. g.              |
| 2302       | May 29  | 55 03 50                            | 163 37 30 | 44           | 44            | 41           | 16     | fne. bk. s.          |
| 2303       | May 29  | 55 04 15                            | 163 30 45 | 44           | 44            | 41           | 11     | fne. bk. s.          |
| 2304       | May 29  | 55 10 00                            | 163 13 45 | 42           | 44            | -----        | 15     | s.                   |
| 2305       | May 29  | 55 16 10                            | 163 01 30 | 44           | 46            | -----        | 14     | fne. gy. s.          |
| 2306       | May 29  | 55 22 00                            | 162 53 30 | 44           | 46            | -----        | 13     | bk. g.               |
| 2307       | May 29  | 55 27 40                            | 162 44 15 | 44           | 45            | -----        | 16     | fne. gy. s. bk. sp.  |
| 2308       | May 29  | 55 32 30                            | 162 38 00 | 44           | 45            | -----        | 22     | fne. gy. s.          |
| 2309       | May 29  | 55 36 40                            | 162 30 20 | 44           | 47            | -----        | 23     | rky. brk. sh.        |
| 2310       | May 29  | 55 39 45                            | 162 24 00 | 44           | 45            | -----        | 22     | g. brk. sh.          |
| 2311       | May 29  | 55 42 45                            | 162 18 00 | 44           | 45            | -----        | 20     | fne. bk. s.          |
| 2312       | May 29  | 55 46 15                            | 162 12 00 | 45           | 45            | 41           | 16     | rky. sh.             |
| 2313       | May 29  | 55 48 15                            | 162 07 15 | 44           | 45            | -----        | 17     | p. bk. s.            |
| 2314       | May 29  | 55 51 00                            | 162 01 00 | 45           | 45            | -----        | 15½    | g.                   |
| 2315       | May 29  | 55 52 00                            | 161 58 00 | 45           | 45            | -----        | 13     | r.                   |
| 2316       | May 30  | 55 54 40                            | 161 51 40 | 41           | 42            | -----        | 16     | bk. s. brk. sh.      |
| 2317       | May 30  | 55 57 00                            | 161 45 00 | 42           | 43            | -----        | 16     | g. brk. sh.          |
| 2318       | May 30  | 55 59 40                            | 161 35 45 | 41           | 42            | -----        | 22     | bk. s.               |
| 2319       | May 30  | 56 01 00                            | 161 26 00 | 41           | 42            | -----        | 16     | bk. s.               |
| 2320       | May 30  | 56 01 30                            | 161 16 45 | 43           | 43            | -----        | 14     | bk. s.               |
| 2321       | May 30  | 56 01 40                            | 161 12 30 | 43           | 43            | -----        | 12     | bk. s.               |
| 2322       | May 30  | 56 02 45                            | 161 03 30 | 43           | 43            | -----        | 12     | crs. bk. s.          |
| 2323       | May 30  | 56 04 15                            | 160 55 20 | 43           | 44            | -----        | 13     | fne. br. s.          |
| 2324       | May 30  | 56 04 15                            | 160 46 00 | 43           | 44            | -----        | 11     | crs. s. and g.       |
| 2325       | May 30  | 56 04 00                            | 160 43 45 | 44           | 43            | -----        | 12     | fne. g.              |
| 2326       | May 30  | 56 09 15                            | 160 30 30 | 44           | 45            | -----        | 14     | fne. gy. s.          |
| 2327       | May 30  | 56 12 00                            | 160 23 15 | 44           | 45            | -----        | 13     | fne. bk. s.          |
| 2328       | May 30  | 56 14 15                            | 160 21 15 | 48           | 46            | -----        | 13     | crs. bk. s.          |
| 2329       | May 30  | 56 18 00                            | 160 18 00 | 46           | 48            | -----        | 11     | bk. s. g.            |
| 2330       | May 30  | 56 25 40                            | 160 06 20 | 46           | 46            | 39           | 13     | g.                   |
| 2331       | May 30  | 56 33 20                            | 159 49 30 | 47           | 42            | -----        | 16     | bk. g.               |
| 2332       | May 30  | 56 42 20                            | 159 25 20 | 45           | 41            | -----        | 18     | bk. g.               |
| 2333       | May 30  | 56 46 30                            | 159 08 30 | 45           | 44            | -----        | 14     | bk. g.               |
| 2334       | May 30  | 56 48 30                            | 158 58 30 | 45           | 44            | -----        | 12     | gy. s.               |
| 2335       | May 30  | 56 52 00                            | 158 51 00 | 44           | 43            | -----        | 9      | fne. gy. s.          |
| 2336       | May 30  | 56 54 00                            | 158 48 30 | 44           | 43            | -----        | 11     | fne. bk. s.          |
| 2337       | May 30  | 57 02 45                            | 158 40 30 | 44           | 42            | -----        | 10     | fne. gy. s. bk. sp.  |
| 2338       | May 30  | 57 05 00                            | 158 39 00 | 44           | 42            | -----        | 12     | fne. gy. s. bk. sp.  |
| 2339       | May 31  | 57 08 30                            | 158 36 15 | 44           | 43            | -----        | 13     | fne. bk. s.          |
| 2340       | May 31  | 57 13 30                            | 158 32 00 | 44           | 43            | -----        | 19     | bk. s. g.            |
| 2341       | May 31  | 57 19 00                            | 158 25 30 | 44           | 43            | -----        | 19     | bk. s. g.            |
| 2342       | May 31  | 57 24 30                            | 158 19 30 | 43           | 43            | -----        | 16     | bk. s. g.            |
| 2343       | May 31  | 57 29 30                            | 158 13 30 | 42           | 43            | -----        | 15     | fne. gy. s. g.       |
| 2344       | May 31  | 57 32 00                            | 158 09 30 | 43           | 43            | -----        | 14½    | fne. gy. s. g.       |
| 2345       | May 31  | 57 34 50                            | 158 06 00 | 42           | 43            | -----        | 13     | fne. gy. s. g.       |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.   |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|-------------|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.     | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Bering Sea. |           |              |               |              |        |                      |
|            | 1890.   | ° ' "       | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2346       | May 31  | 57 38 00    | 157 57 00 | 43           | 42            | -----        | 10     | gy. s.               |
| 2347       | May 31  | 57 40 00    | 157 53 00 | 43           | 43            | -----        | 7.5    | gy. s.               |
| 2348       | May 31  | 57 44 00    | 157 52 30 | 44           | 44            | -----        | 10     | gy. s.               |
| 2349       | May 31  | 57 48 40    | 147 49 00 | 44           | 44            | -----        | 8      | crs. bk. s.          |
| 2350       | May 31  | 57 52 40    | 157 46 30 | 44           | 44            | -----        | 10     | gy. s.               |
| 2351       | May 31  | 57 57 00    | 157 43 00 | 46           | 45            | -----        | 7      | gy. s.               |
| 2352       | May 31  | 58 00 40    | 157 41 00 | 45           | 44            | -----        | 7      | gy. s.               |
| 2353       | May 31  | 58 03 40    | 157 40 00 | 46           | 45            | -----        | 5.25   | gy. s.               |
| 2354       | May 31  | 58 07 00    | 157 41 30 | 46           | 45            | -----        | 7      | gy. s.               |
| 2355       | May 31  | 58 08 40    | 157 42 00 | 45           | 44            | -----        | 5      | fne. gy. s.          |
| 2356       | May 31  | 58 14 00    | 157 44 00 | 45           | 44            | -----        | 4.5    | g.                   |
| 2357       | May 31  | 58 22 20    | 157 42 00 | 45           | 44            | -----        | 4.5    | p.                   |
| 2358       | May 31  | 58 27 10    | 157 39 00 | 46           | 45            | -----        | 5      | p.                   |
| 2359       | May 31  | 58 32 00    | 157 33 00 | 46           | 45            | -----        | 5.5    | g.                   |
| 2360       | May 31  | 58 34 00    | 157 31 00 | 45           | 44            | -----        | 6.25   | bk. s.               |
| 2361       | May 31  | 58 35 00    | 157 28 30 | 48           | 49            | -----        | 4      | s.                   |
| 2362       | May 31  | 58 39 00    | 157 19 30 | 48           | 49            | -----        | 7.5    | p.                   |
| 2363       | June 2  | 58 40 45    | 157 16 20 | 43           | 45            | -----        | 4.25   | bk. s.               |
| 2364       | June 2  | 58 40 30    | 157 21 30 | 44           | 45            | -----        | 4.5    | fne. gy. s.          |
| 2365       | June 2  | 58 40 30    | 157 22 30 | 44           | 45            | -----        | 5 feet | fne. gy. s.          |
| 2366       | June 2  | 58 39 00    | 157 24 00 | 45           | 45            | -----        | 5.5    | fne. gy. s. bk. sp.  |
| 2367       | June 2  | 58 37 45    | 157 26 30 | 45           | 45            | -----        | 12     | fne. gy. s. bk. sp.  |
| 2368       | June 7  | 58 07 00    | 158 54 00 | 35           | 40            | -----        | 22.25  | fne. gy. s.          |
| 2369       | June 8  | 58 12 00    | 159 06 15 | 38           | 41            | -----        | 21.5   | fne. gy. s. and r.   |
| 2370       | June 8  | 58 18 40    | 159 17 30 | 40           | 41            | -----        | 10.5   | fne. gy. s.          |
| 2371       | June 8  | 58 40 00    | 160 00 00 | 46           | 48            | -----        | 8      |                      |
| 2372       | June 8  | 58 42 15    | 160 04 00 | 43           | 45            | -----        | 8.5    |                      |
| 2373       | June 8  | 58 44 15    | 160 07 30 | 45           | 46            | -----        | 11.5   |                      |
| 2374       | June 9  | 58 28 30    | 161 53 00 | 39           | 38            | 35           | 12.5   | g.                   |
| 2375       | June 9  | 58 35 30    | 162 11 00 | 39           | 38            | 37           | 25     | g.                   |
| 2376       | June 13 | 58 18 30    | 162 50 00 | 38           | 39            | 35.5         | 16.5   | fne. gy. s.          |
| 2377       | June 14 | 58 00 00    | 163 24 30 | 38           | 39            | -----        | 23     | fne. gy. s.          |
| 2378       | June 14 | 57 49 50    | 163 44 00 | 38           | 39            | 37           | 24     | fne. gy. s.          |
| 2379       | June 14 | 56 05 00    | 164 38 00 | 43           | 44            | 36           | 51     | gn. m.               |
| 2380       | June 15 | 55 52 30    | 164 47 00 | 42           | 43            | 35           | 46     | bk. s. and m.        |
| 2381       | June 15 | 55 37 30    | 164 51 00 | 42           | 43            | 39           | 58     | bk. s. and m.        |
| 2382       | June 24 | 54 40 30    | 165 41 00 | 43           | 44            | 38.5         | 148    | m. and fne. s.       |
| 2383       | June 24 | 54 37 40    | 164 58 00 | 42           | 44            | 40.8         | 30     | bk. g.               |
| 2384       | June 24 | 54 46 00    | 164 55 30 | 45           | 45            | 40.2         | 37     | crs. s. g. and p.    |
| 2385       | June 24 | 54 56 30    | 165 15 30 | 43           | 45            | 40           | 62     | bk. m.               |
| 2386       | June 24 | 54 54 00    | 164 36 00 | 43           | 45            | 41.3         | 40     | bk. g.               |
| 2387       | June 24 | 54 53 15    | 164 33 00 | 42           | 44            | 41.4         | 24     | bk. g.               |
| 2388       | June 24 | 54 59 00    | 164 13 00 | 43           | 44            | 41.2         | 25     | crs. s. g.           |
| 2389       | June 25 | 55 08 45    | 164 18 00 | 42           | 44            | 40           | 46     | bk. g.               |
| 2390       | June 25 | 55 18 30    | 164 23 15 | 42           | 44            | 39           | 56     | bk. m. and g.        |
| 2391       | June 25 | 55 25 00    | 164 05 20 | 42           | 45            | 38.8         | 53     | bk. s. and g.        |
| 2392       | June 25 | 55 14 00    | 163 21 30 | 44           | 46            | 42.6         | 26     | bk. s.               |
| 2393       | June 25 | 55 34 30    | 163 37 00 | 45           | 46            | 40           | 44     | gy. s.               |
| 2394       | June 25 | 55 38 00    | 163 20 45 | 49           | 48            | 39.5         | 42     | gy. s.               |
| 2395       | June 25 | 55 33 30    | 163 16 15 | 45           | 47            | 40           | 36     | bk. s.               |
| 2396       | June 25 | 55 23 40    | 163 07 30 | 42           | 45            | 42.6         | 20     | bk. g.               |
| 2397       | June 26 | 55 21 30    | 162 56 00 | 43           | 47            | 43.8         | 16     | crs. bk. s. sh.      |
| 2398       | June 27 | 55 36 15    | 163 09 00 | 43           | 45            | 39           | 35     | fne. gy. s.          |
| 2399       | June 27 | 55 37 45    | 162 40 30 | 42           | 46            | 41           | 26     | fne. gy. s.          |
| 2400       | June 27 | 55 51 10    | 162 30 30 | 42           | 44            | -----        | 34     | fne. gy. s.          |
| 2401       | June 28 | 55 57 45    | 162 43 00 | 42           | 44            | -----        | 46     | fne. gy. s.          |
| 2402       | June 28 | 56 05 15    | 162 31 00 | 42           | 45            | 37           | 41     | fne. gy. s.          |
| 2403       | June 28 | 55 58 30    | 162 18 00 | 42           | 45            | 37           | 40     | fne. gy. s. bk. sp.  |
| 2404       | June 28 | 56 06 15    | 161 58 00 | 42           | 44            | 40.6         | 34     | bk. s.               |
| 2405       | June 28 | 56 19 00    | 162 26 00 | 43           | 45            | 38           | 40     | fne. gy. s. and g.   |
| 2406       | June 28 | 56 33 45    | 162 26 00 | 44           | 45            | 39           | 41     | fne. gy. s.          |
| 2407       | June 28 | 56 20 30    | 161 54 45 | 42           | 45            | 38.2         | 48     | fne. gy. s. bk. sp   |
| 2408       | June 28 | 56 06 30    | 161 25 30 | 42           | 45            | 43           | 21     | p.                   |
| 2409       | June 28 | 56 10 45    | 161 09 15 | 42           | 44            | 43.5         | 21     | gy. s.               |
| 2410       | June 29 | 56 17 20    | 161 22 00 | 43           | 46            | 41           | 30     | bk. s. g.            |
| 2411       | June 29 | 56 24 10    | 161 37 00 | 42           | 45            | 40           | 37     | gy. s.               |
| 2412       | June 29 | 56 38 30    | 161 38 00 | 44           | 45            | 38.8         | 46     | fne. gy. s.          |
| 2413       | June 29 | 56 21 15    | 161 03 00 | 42           | 44            | 41           | 35     | fne. gy. s. bk. sp   |
| 2414       | June 29 | 56 10 15    | 160 42 30 | 45           | 46            | -----        | 15     | fne. gy. s.          |
| 2415       | July 16 | 56 04 30    | 160 39 30 | 50           | 54            | -----        | 8.5    | fne. gy. s.          |
| 2416       | July 16 | 56 09 45    | 160 33 00 | 48           | 54            | -----        | 14.75  | crs. bk. s.          |
| 2417       | July 16 | 56 14 15    | 160 26 45 | 48           | 49            | -----        | 12     | bk. g.               |
| 2418       | July 16 | 56 22 00    | 160 37 30 | 47           | 48            | 44           | 28     | fne. gy. s.          |
| 2419       | July 16 | 56 29 30    | 160 49 00 | 45           | 47            | -----        | 37     | fne. gy. s.          |
| 2420       | July 17 | 56 36 30    | 161 00 30 | 45           | 46            | 41           | 38     | fne. gy. s.          |
| 2421       | July 17 | 56 44 15    | 161 12 30 | 44           | 46            | 40.5         | 38     | fne. gy. s.          |
| 2422       | July 17 | 56 52 15    | 160 58 00 | 44           | 46            | 40           | 40     | fne. gy. s.          |
| 2423       | July 17 | 56 33 20    | 159 43 30 | 44           | 45            | -----        | 15     | bk. s. g.            |
| 2424       | July 17 | 56 40 40    | 159 54 30 | 43           | 45            | -----        | 30     | fne. gy. s. g.       |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.   |           | Temperature. |          |         | Depth. | Character of bottom. |
|------------|---------|-------------|-----------|--------------|----------|---------|--------|----------------------|
|            |         | Lat. N.     | Long. W.  | Air.         | Surface. | Bottom. |        |                      |
|            |         | Bering Sea. |           |              |          |         |        |                      |
|            | 1890.   | ° ' "       | ° ' "     | ° F.         | ° F.     | ° F.    | Fms.   |                      |
| 2425       | July 17 | 56 48 00    | 160 05 30 | 42           | 42       | -----   | 35     | crs. bk. s.          |
| 2426       | July 17 | 56 55 30    | 160 17 30 | 42           | 43       | 38      | 36     | gy. s.               |
| 2427       | July 17 | 57 03 20    | 160 29 00 | 41           | 43       | -----   | 39     | bk. s.               |
| 2428       | July 17 | 57 10 30    | 160 15 00 | 41           | 43       | 38      | 38     | bk. s.               |
| 2429       | July 17 | 57 04 20    | 160 00 00 | 41           | 43       | 38.5    | 34     | fne. gy. s. bk. sp.  |
| 2430       | July 18 | 56 57 45    | 159 46 00 | 40           | 42       | -----   | 34     | gy. s.               |
| 2431       | July 18 | 56 57 00    | 159 31 00 | 40           | 43       | 41      | 30     | bk. g.               |
| 2432       | July 18 | 57 06 20    | 159 23 00 | 42           | 46       | 40      | 31     | gy. s. g.            |
| 2433       | July 18 | 57 21 30    | 159 46 30 | 43           | 44       | 40      | 32     | bk. s. g.            |
| 2434       | July 18 | 57 23 15    | 159 17 00 | 43           | 44       | 40      | 31     | fne. gy. s.          |
| 2435       | July 18 | 57 10 15    | 158 49 00 | 41           | 43       | 41.6    | 25     | gy. s.               |
| 2436       | July 18 | 57 07 30    | 158 42 30 | 41           | 43       | -----   | 20     | s.                   |
| 2437       | July 18 | 57 05 45    | 158 39 00 | 41           | 44       | -----   | 17     | s.                   |
| 2438       | July 19 | 57 05 30    | 158 37 30 | 41           | 44       | -----   | 12½    | bk. s.               |
| 2439       | July 19 | 57 48 30    | 158 48 00 | 45           | 48       | 43.5    | 24     | gy. s.               |
| 2440       | July 19 | 57 45 15    | 157 56 00 | 46           | 50       | -----   | 13     | fne. gy. s.          |
| 2441       | July 20 | 57 56 45    | 158 17 00 | 47           | 50       | 40.4    | 20     | gy. s. bk. sp.       |
| 2442       | July 20 | 58 00 30    | 159 13 30 | 51           | 55       | 44.2    | 21     | bk. s.               |
| 2443       | July 20 | 58 01 00    | 159 33 15 | 49           | 55       | 45      | 23     | gy. s.               |
| 2444       | July 20 | 58 24 00    | 160 17 30 | 49           | 53       | -----   | 6½     | gy. s. g.            |
| 2445       | July 21 | 57 59 00    | 160 24 45 | 49           | 50       | 40.1    | 26     | fne. gy. s.          |
| 2446       | July 21 | 57 32 40    | 160 00 00 | 48           | 47       | 41      | 29     | fne. gy. s.          |
| 2447       | July 21 | 57 39 00    | 160 39 30 | 50           | 52       | 39.5    | 31     | fne. gy. s.          |
| 2448       | July 21 | 57 50 40    | 160 57 00 | 50           | 52       | 39.8    | 27     | fne. gy. s.          |
| 2449       | July 21 | 58 10 20    | 161 24 30 | 47           | 49       | 40.6    | 23     | fne. bk. s.          |
| 2450       | July 21 | 58 14 20    | 161 30 30 | 47           | 49       | 40.2    | 22     | fne. gy. s. g.       |
| 2451       | July 22 | 58 05 00    | 161 52 15 | 46           | 49       | 41      | 31     | fne. gy. s.          |
| 2452       | July 22 | 57 38 15    | 161 28 30 | 47           | 50       | 41.2    | 30     | fne. gy. s.          |
| 2453       | July 22 | 57 31 20    | 161 23 00 | 47           | 51       | -----   | 32     | gy. s.               |
| 2454       | July 22 | 57 11 15    | 161 05 00 | 45           | 50       | 41.8    | 29     | dk. s.               |
| 2455       | July 22 | 56 57 30    | 160 52 30 | 45           | 48       | 41      | 38     | fne. gy. s.          |
| 2456       | July 22 | 56 31 15    | 160 23 30 | 45           | 49       | -----   | 32     | gy. s. g.            |
| 2457       | July 22 | 56 27 45    | 160 25 30 | 46           | 49       | -----   | 30     | fne. gy. s.          |
| 2458       | July 22 | 56 25 20    | 160 23 30 | 46           | 50       | -----   | 22     | g.                   |
| 2459       | July 22 | 56 22 45    | 160 21 30 | 46           | 50       | -----   | 20     | fne. gy. s.          |
| 2460       | July 29 | 56 05 30    | 161 02 00 | 53           | 51       | -----   | 18     | g.                   |
| 2461       | July 29 | 55 55 15    | 161 15 00 | 49           | 51       | -----   | 14     | g.                   |
| 2462       | Aug. 2  | 54 02 45    | 166 33 00 | 47           | 50       | -----   | 61     | bk. s. g.            |
| 2463       | Aug. 2  | 54 03 10    | 166 52 30 | 48           | 48       | 43      | 365    | gn. m.               |
| 2464       | Aug. 2  | 54 01 40    | 167 09 00 | 48           | 48       | 36.2    | 802    | gn. m.               |
| 2465       | Aug. 2  | 53 58 40    | 167 35 00 | 48           | 50       | 35.8    | 885    | m.                   |
| 2466       | Aug. 2  | 53 54 10    | 167 52 00 | 48           | 51       | 36.7    | 643    | bk. s. g.            |
| 2467       | Aug. 2  | 53 53 00    | 167 56 00 | 48           | 51       | 37      | 578    | fne. bk. s.          |
| 2468       | Aug. 3  | 54 43 00    | 171 16 00 | 50           | 52       | 35      | 1,745  | gn. oz.              |
| 2469       | Aug. 3  | 55 31 00    | 171 42 00 | 48           | 51       | 35      | 1,818  | gn. oz.              |
| 2470       | Aug. 4  | 56 51 00    | 172 28 00 | 46           | 50       | 38.5    | 69     | gn. m.               |
| 2471       | Aug. 4  | 57 00 30    | 173 25 00 | 46           | 50       | 38.2    | 314    | gn. m.               |
| 2472       | Aug. 4  | 57 19 30    | 174 07 00 | 45           | 50       | 37.5    | 445    | gn. m.               |
| 2473       | Aug. 5  | 57 46 00    | 174 35 00 | 47           | 50       | 35      | 1,740  | gn. oz.              |
| 2474       | Aug. 5  | 58 14 00    | 174 35 00 | 47           | 50       | 35.8    | 977    | fne. dk. s.          |
| 2475       | Aug. 5  | 58 43 00    | 174 33 00 | 47           | 50       | 38      | 144    | fne. dk. s.          |
| 2476       | Aug. 6  | 56 50 00    | 175 15 00 | 46           | 50       | 35      | 1,887  | gn. oz.              |
| 2477       | Aug. 6  | 56 02 10    | 175 35 00 | 48           | 50       | 34.9    | 1,998  | gn. oz.              |
| 2478       | Aug. 7  | 55 17 00    | 175 32 00 | 46           | 50       | 35      | 2,036  | gn. oz.              |
| 2479       | Aug. 7  | 54 30 30    | 175 32 00 | 48           | 49       | 35      | 2,147  | gn. oz.              |
| 2480       | Aug. 7  | 53 42 00    | 175 33 00 | 49           | 50       | 35      | 2,053  | bn. oz.              |
| 2481       | Aug. 15 | 53 56 02    | 166 27 05 | 50           | 54       | -----   | 25     | fne. gy. s.          |
| 2482       | Aug. 15 | 53 57 32    | 166 30 20 | 50           | 54       | 41      | 79     | fne. s. sh. m.       |
| 2483       | Aug. 15 | 53 58 06    | 166 31 26 | 50           | 54       | 40.8    | 95     | fne. s. m.           |
| 2484       | Aug. 15 | 53 58 50    | 166 33 10 | 50           | 54       | 41.6    | 118    | fne. s. bn. m.       |
| 2485       | Aug. 15 | 53 59 18    | 166 34 27 | 50           | 54       | 42.3    | 53     | fne. dk. s.          |
| 2486       | Aug. 15 | 53 59 42    | 166 35 29 | 56           | 54       | 45.8    | 22     | rd. and bk. g.       |
| 2487       | Aug. 15 | 53 59 47    | 166 33 48 | 56           | 52       | 41.3    | 71     | fne. s. m.           |
| 2488       | Aug. 15 | 53 59 42    | 166 31 44 | 56           | 52       | 40.6    | 99     | fne. s. m.           |
| 2489       | Aug. 15 | 53 59 26    | 166 28 00 | 56           | 56       | 41.3    | 66     | fne. s. m.           |
| 2490       | Aug. 15 | 54 00 08    | 166 24 14 | 57           | 55       | 44.3    | 37     | g. sh. p.            |
| 2491       | Aug. 15 | 54 01 23    | 166 23 37 | 60           | 55       | 44.5    | 40     | fne. g.              |
| 2492       | Aug. 15 | 54 01 29    | 166 25 08 | 60           | 55       | 42.5    | 57     | fne. s. g.           |
| 2493       | Aug. 15 | 54 01 59    | 166 29 32 | 55           | 55       | 40.9    | 103    | fne. bk. s.          |
| 2494       | Aug. 15 | 54 02 13    | 166 30 50 | 55           | 55       | 40.9    | 97     | bk. s.               |
| 2495       | Aug. 15 | 54 02 24    | 166 35 19 | 56           | 55       | 40      | 77     | bk. s. sh.           |
| 2496       | Aug. 15 | 54 02 50    | 166 37 00 | 56           | 55       | 42.1    | 58     | bk. s. g. sh.        |
| 2497       | Aug. 15 | 54 04 30    | 166 40 00 | 56           | 55       | 38.3    | 322    | bk. s.               |
| 2498       | Aug. 15 | 54 02 00    | 166 42 00 | 53           | 54       | -----   | 148    | bk. s.               |
| 2499       | Aug. 15 | 54 00 45    | 166 40 30 | 53           | 54       | 44.5    | 37     | bk. s.               |
| 2500       | Aug. 16 | 54 00 25    | 166 46 00 | 62           | 53       | 44      | 52     | bk. s. g.            |
| 2501       | Aug. 16 | 54 00 25    | 166 48 00 | 59           | 54       | 39      | 179    | bk. s.               |
| 2502       | Aug. 16 | 53 59 30    | 166 48 30 | 60           | 54       | 43.5    | 50     | bk. s.               |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                       | Date.    | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|----------------------------------|----------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|                                  |          | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Bering Sea.                      |          |           |           |              |               |              |        |                      |
|                                  | 1890.    | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2503                             | Aug. 16  | 53 58 50  | 166 51 30 | 60           | 54            | 44.1         | 22     | sh.                  |
| 2504                             | Aug. 16  | 54 00 00  | 166 58 00 | 60           | 52            | 38.2         | 316    | gn. m.               |
| 2505                             | Aug. 16  | 53 56 30  | 167 03 00 | 60           | 54            | 46           | 36     | fne. rd. and bk. s.  |
| 2506                             | Aug. 16  | 53 55 40  | 167 06 20 | 60           | 54            | 40.9         | 97     | bk. s. sh. g.        |
| 2507                             | Aug. 16  | 53 52 35  | 167 09 00 | 60           | 54            | 46           | 22     | gy. s.               |
| 2508                             | Aug. 16  | 53 52 00  | 167 12 15 | 54           | 53            | 44           | 40     | r. g.                |
| 2509                             | Aug. 16  | 53 52 00  | 167 14 00 | 59           | 52            | 39           | 166    | bk. m.               |
| 2510                             | Aug. 18  | 53 50 25  | 167 13 00 | 59           | 52            | 43           | 55     | bk. g.               |
| 2511                             | Aug. 16  | 53 50 15  | 167 15 00 | 59           | 52            | 42           | 59     | bk. g.               |
| 2512                             | Aug. 16  | 53 50 05  | 167 16 15 | 59           | 52            | 38.8         | 106    | bk. s. g.            |
| 2513                             | Aug. 16  | 53 50 05  | 167 07 20 | 54           | 52            | 44.1         | 47     | bk. s. g.            |
| 2514                             | Aug. 18  | 53 43 50  | 167 00 00 | 50           | 52            | -----        | 103    | bk. m.               |
| 2515                             | Aug. 18  | 53 43 05  | 167 02 30 | 49           | 50            | 40.3         | 109    | dk. gn. m.           |
| 2516                             | Aug. 18  | 53 43 00  | 167 09 00 | 49           | 50            | -----        | 62     | bk. s. m.            |
| 2517                             | Aug. 18  | 53 41 45  | 167 16 00 | 49           | 48            | 43           | 54     | s. g.                |
| 2518                             | Aug. 18  | 53 42 00  | 167 21 30 | 49           | 48            | -----        | 58     | bk. s. m.            |
| 2519                             | Aug. 18  | 53 41 45  | 167 27 20 | 49           | 50            | 40           | 69     | bk. s.               |
| 2520                             | Aug. 18  | 53 41 00  | 167 33 25 | 51           | 52            | 38           | 394    | gn. m.               |
| 2521                             | Aug. 18  | 53 36 30  | 167 23 25 | 50           | 50            | 42.4         | 43     | crs. bk. s.          |
| 2522                             | Aug. 18  | 53 30 40  | 167 11 40 | 51           | 50            | 43.9         | 32     | bk. s.               |
| 2523                             | Aug. 18  | 53 30 25  | 167 17 30 | 51           | 50            | 42.9         | 37     | bk. s.               |
| 2524                             | Aug. 18  | 53 30 55  | 167 31 10 | 50           | 50            | 41.5         | 44     | bk. s.               |
| 2525                             | Aug. 18  | 53 32 55  | 167 36 50 | 48           | 47            | 39.5         | 136    | bk. s. m.            |
| 2526                             | Aug. 18  | 53 37 00  | 167 41 50 | 47           | 47            | 37           | 524    | gn. m.               |
| 2527                             | Aug. 19  | 53 37 30  | 167 43 50 | 45           | 45            | 38.5         | 247    | gn. m.               |
| 2528                             | Aug. 19  | 53 30 55  | 167 36 20 | 45           | 45            | 41.5         | 49     | bk. s. m.            |
| 2529                             | Aug. 19  | 53 28 25  | 167 33 40 | 45           | 45            | 41.8         | 43     | bk. s.               |
| 2530                             | Aug. 19  | 53 24 30  | 167 34 05 | 46           | 46            | 42           | 42     | bk. s. sh.           |
| 2531                             | Aug. 19  | 53 23 15  | 167 32 50 | 48           | 50            | 44.4         | 15     | bk. s. g.            |
| 2532                             | Aug. 20  | 53 24 20  | 167 37 05 | 48           | 48            | 42           | 60     | bk. s. g.            |
| 2533                             | Aug. 20  | 53 23 30  | 167 39 25 | 48           | 48            | 42.3         | 47     | g. sh.               |
| 2534                             | Aug. 20  | 53 23 30  | 167 42 40 | 48           | 48            | 42.1         | 39     | bk. g. sh.           |
| 2535                             | Aug. 20  | 53 24 00  | 167 46 10 | 47           | 48            | 42.9         | 30     | bk. s.               |
| 2536                             | Aug. 20  | 53 25 20  | 167 48 20 | 47           | 48            | 42.1         | 37     | bk. s.               |
| 2537                             | Aug. 20  | 53 28 15  | 167 45 50 | 47           | 48            | 42.2         | 35     | bk. s. g.            |
| 2538                             | Aug. 20  | 53 31 45  | 167 43 45 | 47           | 48            | 41.5         | 43     | bk. s.               |
| 2539                             | Aug. 20  | 53 48 00  | 167 24 00 | 48           | 47            | 38           | 624    | bn. m.               |
| 2540                             | Aug. 22  | 53 53 45  | 166 30 05 | 46           | 48            | -----        | 19     | m.                   |
| 2541                             | Aug. 22  | 53 54 00  | 166 29 30 | 46           | 48            | -----        | 17     | gn. m.               |
| 2542                             | Aug. 22  | 53 55 35  | 166 27 45 | 46           | 48            | -----        | 19     | s. m.                |
| 2543                             | Aug. 22  | 53 56 00  | 166 28 30 | 47           | 48            | 43.3         | 35     | fne. gy. s.          |
| 2544                             | Aug. 22  | 53 56 45  | 166 30 15 | 47           | 48            | 41.8         | 63     | fne. s. m.           |
| 2545                             | Aug. 22  | 53 57 30  | 166 32 15 | 47           | 47            | 41.1         | 65     | fne. s. m.           |
| 2546                             | Aug. 22  | 53 58 45  | 166 34 25 | 47           | 48            | -----        | 23     | bk. g.               |
| 2547                             | Aug. 22  | 53 58 20  | 166 34 45 | 50           | 50            | 50           | 17     | bk. s.               |
| 2548                             | Aug. 22  | 53 58 05  | 166 34 10 | 50           | 50            | 41.8         | 54     | fne. bk. s.          |
| 2549                             | Aug. 22  | 53 55 55  | 166 33 55 | 50           | 52            | 42.4         | 45     | fne. bk. s.          |
| 2550                             | Aug. 22  | 53 55 05  | 166 34 35 | 54           | 54            | 43.3         | 47     | bn. m.               |
| 2551                             | Aug. 22  | 53 54 15  | 166 35 35 | 54           | 54            | 42.1         | 58     | bn. m.               |
| 2552                             | Aug. 22  | 53 53 20  | 166 36 20 | 54           | 54            | -----        | 13     | crs. bk. s.          |
| 2553                             | Aug. 26  | 54 02 15  | 166 11 20 | 46           | 47            | 34.3         | 41     | r.                   |
| 2554                             | Aug. 26  | 54 00 25  | 166 05 40 | 46           | 47            | 45.7         | 26     | sh. r.               |
| North Pacific off Alaska.        |          |           |           |              |               |              |        |                      |
| 2555                             | Aug. 26  | 53 59 00  | 165 57 20 | 54           | 46            | 44.9         | 48     | g.                   |
| 2556                             | Aug. 27  | 53 58 00  | 162 37 00 | 60           | 55            | 37.8         | 619    | gn. m.               |
| 2557                             | Aug. 27  | 54 01 00  | 161 42 30 | 59           | 53            | 38.1         | 542    | r.                   |
| 2558                             | Aug. 27  | 54 11 00  | 160 37 00 | 52           | 52            | 36.6         | 756    | gn. m.               |
| 2559                             | Aug. 29  | 55 41 00  | 154 48 00 | 54           | 51            | 37.9         | 494    | gn. m. s.            |
| 2560                             | Aug. 29  | 56 00 00  | 153 30 00 | 53           | 52            | 39.5         | 207    | m.                   |
| 2561                             | Aug. 29  | 56 00 00  | 152 56 00 | 54           | 52            | 35.5         | 1,152  | gn. m.               |
| 2562                             | Aug. 30  | 56 00 30  | 152 26 00 | 55           | 54            | 34.9         | 2,197  | bl. m.               |
| 2563                             | Aug. 30  | 56 01 00  | 152 26 00 | 55           | 54            | 34.5         | 2,620  | gn. m.               |
| 2564                             | Aug. 30  | 56 01 00  | 151 00 00 | 54           | 53            | 35.1         | 2,935  | bn. m. s. oz.        |
| 2565                             | Aug. 30  | 56 02 00  | 150 38 00 | 54           | 54            | 35.3         | 2,925  | gy. oz.              |
| 2566                             | Aug. 30  | 55 59 30  | 149 44 00 | 54           | 54            | 34.9         | 2,776  | gy. oz.              |
| 2567                             | Aug. 31  | 55 54 00  | 147 57 00 | 54           | 54            | 35.1         | 2,414  | bn. m.               |
| 2568                             | Aug. 31  | 55 49 00  | 144 57 00 | 55           | 54            | 35.1         | 2,132  | gy. oz.              |
| 2569                             | Sept. 1  | 54 53 00  | 141 06 00 | 57           | 56            | 35.1         | 1,963  | gy. oz. bk. s.       |
| 2570                             | Sept. 2  | 54 22 00  | 137 24 00 | 56           | 56            | 35.3         | 1,655  | lt. bn. oz.          |
| 2571                             | Sept. 3  | 53 06 30  | 133 53 30 | 57           | 57            | 35.3         | 1,566  | oz. bn. m. s.        |
| Off west coast of United States. |          |           |           |              |               |              |        |                      |
| 2572                             | Sept. 24 | 40 26 00  | 124 29 45 | 53           | 51            | 50.4         | 26     | bk. g. p.            |
| 2573                             | Sept. 24 | 40 27 40  | 124 33 00 | 53           | 52            | 49.6         | 52     | dk. m. s.            |
| 2574                             | Sept. 24 | 40 27 45  | 124 36 55 | 53           | 52            | 44.8         | 226    | bk. s. m.            |



*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                                  | Date.    | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|---|----------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|   |          | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Off west coast of United States.            |          |           |           |              |               |              |        |                      |
| 1890.                                       |          |           |           |              |               |              |        |                      |
| 2575  | Sept. 24 | 40 24 35  | 124 37 40 | 53           | 52            | 39.8         | 489    | gn. m.               |
| 2576  | Sept. 24 | 40 23 50  | 124 33 30 | 55           | 54            | 42.6         | 337    | gn. m. s.            |
| 2577  | Sept. 24 | 40 13 30  | 124 25 45 | 58           | 52            | 49.6         | 55     | r. g. sh.            |
| 2578  | Sept. 24 | 40 00 30  | 124 06 30 | 56           | 52            | 52.7         | 23     | fne. gy. s.          |
| 2579  | Sept. 24 | 39 55 45  | 124 10 45 | 55           | 52            | -----        | 184    | gn. m.               |
| 2580  | Sept. 24 | 39 51 25  | 124 07 50 | 55           | 53            | 47.6         | 159    | fne. gy. s.          |
| 2581  | Sept. 24 | 39 52 05  | 124 06 00 | 55           | 53            | 48           | 80     | crs. g.              |
| 2582  | Sept. 24 | 39 47 30  | 124 03 00 | 55           | 54            | 47.6         | 110    | bk. s. m.            |
| 2583  | Sept. 24 | 39 46 25  | 124 05 50 | 55           | 54            | 43.6         | 263    | gn. m.               |
| 2584  | Sept. 24 | 39 42 00  | 124 03 00 | 54           | 54            | 43.4         | 270    | gn. m.               |
| 2585  | Sept. 24 | 39 43 25  | 123 59 10 | 55           | 53            | -----        | 93     | gn. m.               |
| 2586  | Sept. 24 | 39 44 00  | 123 57 40 | 55           | 53            | -----        | 81     | gn. m.               |
| 2587  | Sept. 24 | 39 38 05  | 123 58 30 | 55           | 53            | 47.6         | 102    | gn. m.               |
| 2588  | Sept. 24 | 39 37 15  | 124 00 55 | 55           | 53            | 44.1         | 246    | gn. m.               |
| 2589  | Sept. 24 | 39 32 15  | 123 59 00 | 55           | 53            | 44.6         | 226    | gn. m.               |
| 2590  | Sept. 25 | 39 32 05  | 123 56 50 | 55           | 53            | 46.4         | 140    | s. m.                |
| 2591  | Sept. 25 | 39 27 00  | 123 57 25 | 54           | 53            | 48           | 82     | fne. s. bk. g.       |
| 2592  | Sept. 25 | 39 27 00  | 123 58 30 | 54           | 53            | 46.4         | 157    | m.                   |
| 2593  | Sept. 25 | 39 27 00  | 124 00 00 | 54           | 53            | 44.3         | 234    | m.                   |
| 2594  | Sept. 25 | 39 22 00  | 124 00 00 | 54           | 53            | 43.7         | 238    | m.                   |
| 2595  | Sept. 25 | 39 22 00  | 123 58 00 | 54           | 53            | 47           | 132    | fne. s. m.           |
| 2596  | Sept. 25 | 39 22 00  | 123 56 05 | 54           | 53            | 48.4         | 77     | m.                   |
| 2597  | Sept. 25 | 39 17 15  | 123 55 55 | 54           | 53            | 48.5         | 77     | fne. s. m.           |
| 2598  | Sept. 25 | 39 16 50  | 123 57 45 | 54           | 53            | 47.6         | 86     | m.                   |
| 2599  | Sept. 25 | 39 16 10  | 123 58 35 | 54           | 55            | 47.6         | 161    | gn. m.               |
| 2600  | Sept. 25 | 39 11 05  | 123 59 00 | 54           | 55            | 46.4         | 183    | gn. m.               |
| 2601  | Sept. 25 | 39 12 20  | 123 56 00 | 54           | 54            | 47.6         | 77     | gn. m.               |
| 2602  | Sept. 25 | 39 13 10  | 123 54 00 | 54           | 54            | 48.1         | 69     | gn. m.               |
| 2603  | Sept. 25 | 39 13 50  | 123 52 30 | 54           | 54            | 44.6         | 64     | gn. m.               |
| 2604  | Sept. 25 | 39 12 10  | 123 50 50 | 53           | 54            | 49.4         | 60     | gn. m.               |
| 2605  | Sept. 25 | 39 09 30  | 123 49 00 | 53           | 54            | 49.6         | 54     | gn. m.               |
| 2606  | Sept. 25 | 39 08 10  | 123 52 30 | 53           | 54            | 46.1         | 59     | gn. m.               |
| 2607  | Sept. 25 | 39 07 50  | 123 56 00 | 53           | 54            | 48.6         | 71     | gn. m.               |
| 2608  | Sept. 25 | 39 06 30  | 123 59 30 | 53           | 54            | 45.5         | 199    | gn. m.               |
| Off west coast of South America and Mexico. |          |           |           |              |               |              |        |                      |
| 1891.                                       |          |           |           |              |               |              |        |                      |
| 2609  | Feb. 23  | 7 12 30   | 80 56 00  | 79           | 81            | 57.7         | 127    | g. s. sh.            |
| 2610  | Feb. 28  | 5 29 30   | 86 49 30  | 81           | 82            | 37.2         | 1,009  | glob. oz.            |
| 2611  | Feb. 28  | 5 35 10   | 86 57 10  | 84           | 83.6          | 58.2         | 82     | r.                   |
| 2612  | Mar. 1   | 5 28 20   | 86 55 30  | 78           | 82            | 57.2         | 94     | fne. wh. s.          |
| 2613  | Mar. 5   | 3 50 09   | 81 44 20  | 77           | 77            | 36.5         | 1,181  | bn. glob. oz.        |
| 2614  | Mar. 8   | 7 34 35   | 79 18 20  | 76           | 74            | 49.8         | 226    | s. sh.               |
| 2615  | Mar. 8   | 7 36 20   | 79 18 10  | 76           | 74            | 53.8         | 191    | crs. gy. s.          |
| 2616  | Mar. 8   | 7 38 10   | 79 18 00  | 77           | 74            | 50.3         | 151    | gy. s.               |
| 2617  | Mar. 11  | 7 26 40   | 78 52 40  | 72           | 70            | 36           | 1,681  | r.                   |
| 2618  | Mar. 11  | 7 27 10   | 78 46 40  | 71           | 69            | 36           | 1,708  | gn. glob. oz.        |
| 2619  | Mar. 11  | 7 31 00   | 78 42 30  | 72           | 68            | 36.5         | 1,100  | gn. glob. oz.        |
| 2620  | Mar. 11  | 7 29 00   | 78 43 30  | 76           | 70            | 36           | 1,482  | gn. glob. oz.        |
| 2621  | Mar. 11  | 7 30 00   | 78 40 30  | 77           | 70            | 36.5         | 1,104  | gn. m.               |
| 2622  | Mar. 23  | 1 27 10   | 80 02 10  | 78           | 79            | 40.1         | 809    | sft. m.              |
| 2623  | Mar. 23  | 1 21 30   | 80 01 40  | 78           | 78            | 39.2         | 750    | gn. oz.              |
| 2624  | Mar. 23  | 1 18 00   | 80 01 00  | 77           | 80            | 39           | 724    | gn. oz.              |
| 2625  | Mar. 23  | 1 11 00   | 79 59 30  | 78           | 80            | 41.2         | 536    | gn. m.               |
| 2626  | Mar. 23  | 1 07 00   | 79 59 00  | 79           | 80            | 57.3         | 90     | gn. m. s.            |
| 2627  | Mar. 25  | 0 36 00   | 82 45 00  | 80           | 81            | 36           | 1,832  | gn. glob. oz.        |
| South.                                      |          |           |           |              |               |              |        |                      |
| 2628  | Mar. 26  | 0 13 00   | 84 52 00  | 81           | 81            | -----        | -----  | -----                |
| 2629  | Mar. 26  | 0 20 00   | 85 08 00  | 85           | 83            | 36           | 1,488  | glob. oz.            |
| North.                                      |          |           |           |              |               |              |        |                      |
| 2630  | Apr. 4   | 1 24 30   | 91 38 00  | 82           | 83            | 36.2         | 1,270  | glob. oz.            |
| 2631  | Apr. 11  | 16 20 00  | 99 41 30  | 77           | 80            | 35.8         | 1,823  | yl. s. bk. sp.       |
| 2632  | Apr. 12  | 16 42 00  | 100 11 00 | 79           | 80            | 38.5         | 838    | gn. m.               |
| 2633  | Apr. 12  | 16 45 00  | 100 06 00 | 82           | 82            | 37           | 912    | dk. gn. m.           |
| 2634  | Apr. 12  | 16 46 30  | 100 02 30 | 81           | 82            | 40           | 602    | dk. gn. m.           |
| 2635  | Apr. 18  | 20 47 15  | 106 15 30 | 72           | 74            | 36           | 2,022  | dk. gn. m.           |
| 2636  | Apr. 18  | 21 03 00  | 106 21 30 | 73           | 74            | 35.8         | 2,102  | gn. oz. bk. sp.      |
| 2637  | Apr. 22  | 27 20 00  | 110 54 00 | 72           | 71            | 38           | 773    | bn. m. bk. sp.       |
| 2638  | Apr. 23  | 27 38 00  | 111 04 00 | 72           | 72            | 39.2         | 622    | bn. m. bk. sp.       |
| Off Alaska.                                 |          |           |           |              |               |              |        |                      |
| 2639  | Aug. 3   | 57 07 00  | 170 27 00 | 49           | 46            | -----        | 31     | bk. p. sh.           |
| 2640  | Aug. 3   | 57 15 00  | 170 40 00 | 47           | 46            | -----        | 42     | rky.                 |
| 2641  | Aug. 11  | 53 59 00  | 166 38 30 | 50           | 48            | -----        | 24     | bk. g. brk. sh.      |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.                                       |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|---|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | West coast United States.                       |           |              |               |              |        |                      |
| 1891.      |         | ° ' "   | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2642       | Aug. 28 | 48 24 30  | 124 37 30 | 63           | 52            | -----        | 78     | p.                   |
| 2643       | Aug. 28 | 48 26 00  | 124 37 20 | 63           | 52            | -----        | 144    | br. m.               |
| 2644       | Aug. 28 | 48 28 05  | 124 36 55 | 63           | 52            | -----        | 137    | gy. s. g.            |
| 2645       | Aug. 29 | 48 24 25  | 124 37 45 | 59           | 54            | -----        | 59     | g. s.                |
| 2646       | Aug. 29 | 48 27 10  | 124 39 50 | 61           | 56            | -----        | 140    | g.                   |
| 2647       | Sept. 1 | 48 25 30  | 124 42 15 | 57           | 52            | -----        | 74     | r.                   |
| 2648       | Sept. 2 | 48 23 55  | 124 13 30 | 60           | 55            | -----        | 93     | s. p.                |
| 2649       | Sept. 2 | 48 24 50  | 124 11 40 | 60           | 55            | -----        | 73     | gy. s.               |
| 2650       | Sept. 2 | 48 25 30  | 124 08 00 | 61           | 56            | -----        | 44     | gy. s.               |
| 2651       | Sept. 3 | 48 13 30  | 123 58 00 | 58           | 53            | -----        | 64     | sp.                  |
| 2652       | Sept. 3 | 48 18 00  | 123 49 40 | 59           | 53            | -----        | 95     | rky.                 |
| 2653       | Sept. 4 | 48 19 00  | 123 18 20 | 62           | 58            | -----        | 55     | gy. s. g. sh.        |
| 2654       | Sept. 4 | 48 18 00  | 123 14 00 | 62           | 58            | -----        | 19     | rky.                 |
|            |         | Cable Survey, California to Hawaiian Islands. a |           |              |               |              |        |                      |
| 2655       | Oct. 11 | 36 48 10  | 121 47 50 | 50           | 55            | 49           | 52     | fne. bk. s.          |
| 2656       | Oct. 11 | 36 48 14  | 121 47 38 | 50           | 55            | -----        | 24.5   | gn. m.               |
| 2657       | Oct. 11 | 36 48 15  | 121 47 34 | 50           | 55            | -----        | 20.25  | gn. m.               |
| 2658       | Oct. 11 | 36 48 16  | 121 47 30 | 50           | 55            | -----        | 15.25  | gn. m.               |
| 2659       | Oct. 11 | 36 48 17  | 121 47 28 | 50           | 55            | -----        | 12     | gn. m.               |
| 2660       | Oct. 11 | 36 48 18  | 121 47 26 | 50           | 55            | -----        | 10     | gn. m.               |
| 2661       | Oct. 11 | 36 48 14  | 121 47 26 | 50           | 55            | -----        | 9.75   | gn. m.               |
| 2662       | Oct. 11 | 36 48 10  | 121 47 25 | 50           | 55            | -----        | 4.5    | gn. m.               |
| 2663       | Oct. 11 | 36 48 06  | 121 47 27 | 50           | 55            | -----        | 7.5    | gn. m.               |
| 2664       | Oct. 11 | 36 48 03  | 121 47 28 | 50           | 55            | -----        | 9      | gn. m.               |
| 2665       | Oct. 11 | 36 48 04  | 121 47 30 | 50           | 55            | -----        | 15     | gn. m.               |
| 2666       | Oct. 11 | 36 48 05  | 121 47 34 | 50           | 55            | -----        | 18.5   | gn. m.               |
| 2667       | Oct. 11 | 36 48 06  | 121 47 38 | 50           | 55            | -----        | 23.5   | gn. m.               |
| 2668       | Oct. 11 | 36 48 10  | 121 47 50 | 52           | 55            | -----        | 54     | bk. m.               |
| 2669       | Oct. 11 | 36 47 53  | 121 49 06 | 53           | 56            | -----        | 75     | gn. m.               |
| 2670       | Oct. 11 | 36 47 34  | 121 50 20 | 53           | 57            | 47.5         | 124    | gn. m.               |
| 2671       | Oct. 11 | 36 47 16  | 121 51 20 | 53           | 56            | -----        | 165    | gn. m.               |
| 2672       | Oct. 11 | 36 47 04  | 121 52 45 | 53           | 56            | 46.1         | 213    | gn. m.               |
| 2673       | Oct. 11 | 36 46 50  | 121 53 50 | 53           | 56            | -----        | 266    | br. m.               |
| 2674       | Oct. 11 | 36 46 40  | 121 55 10 | 54           | 53            | 53.5         | 352    | br. m. s.            |
| 2675       | Oct. 11 | 36 46 25  | 121 56 30 | 54           | 53            | -----        | 388    | br. m. s.            |
| 2676       | Oct. 11 | 36 46 15  | 121 57 30 | 54           | 53            | 39.5         | 442    | fne. gy. s.          |
| 2677       | Oct. 11 | 36 45 45  | 122 00 00 | 55           | 56            | -----        | 377    | gy. s.               |
| 2678       | Oct. 11 | 36 45 25  | 122 02 30 | 55           | 55            | 39           | 618    | br. m. s.            |
| 2679       | Oct. 11 | 36 45 00  | 122 05 30 | 55           | 55            | 40           | 548    | br. m. s.            |
| 2680       | Oct. 11 | 36 44 40  | 122 09 30 | 55           | 55            | 37           | 868    | br. m. s.            |
| 2681       | Oct. 11 | 36 44 00  | 122 13 00 | 55           | 55            | -----        | 486    | gy. s.               |
| 2682       | Oct. 11 | 36 43 00  | 122 17 00 | 55           | 55            | 38           | 663    | br. m. s.            |
| 2683       | Oct. 11 | 36 42 30  | 122 22 00 | 54           | 55            | -----        | 770    | br. m. s.            |
| 2684       | Oct. 11 | 36 41 30  | 122 28 00 | 54           | 54            | 35.5         | 1,122  | br. m. s.            |
| 2685       | Oct. 11 | 36 39 30  | 122 41 00 | 55           | 55            | 35.1         | 1,424  | br. m.               |
| 2686       | Oct. 11 | 36 37 00  | 122 54 00 | 55           | 55            | 35           | 1,597  | br. m.               |
| 2687       | Oct. 12 | 36 35 00  | 123 06 00 | 55           | 55            | 35           | 1,661  | br. m.               |
| 2688       | Oct. 12 | 36 32 30  | 123 19 00 | 56           | 54            | 35           | 1,907  | br. m. s.            |
| 2689       | Oct. 12 | 36 30 30  | 123 32 00 | 55           | 55            | 35           | 1,983  | (Lost cup.)          |
| 2690       | Oct. 12 | 36 28 00  | 123 44 00 | 55           | 54            | 35           | 2,061  | gy. oz.              |
| 2691       | Oct. 12 | 36 25 30  | 124 02 50 | 57           | 56            | 34.8         | 2,112  | gy. oz.              |
| 2692       | Oct. 12 | 36 20 00  | 124 20 30 | 55           | 55            | 35           | 2,333  | gy. oz.              |
| 2693       | Oct. 12 | 36 14 30  | 124 37 30 | 59           | 56            | 35           | 2,330  | gy. oz.              |
| 2694       | Oct. 12 | 36 09 00  | 124 55 30 | 58           | 59            | 35           | 2,434  | br. and gy. oz.      |
| 2695       | Oct. 12 | 36 03 00  | 125 13 00 | 58           | 57            | 35           | 2,430  | br. oz.              |
| 2696       | Oct. 13 | 35 58 00  | 125 31 00 | 58           | 57            | 35           | 2,547  | br. and gy. oz.      |
| 2697       | Oct. 13 | 35 52 30  | 125 48 00 | 58           | 57            | 35           | 2,576  | br. and gy. oz.      |
| 2698       | Oct. 13 | 35 47 30  | 126 05 00 | 62           | 62            | 35           | 2,566  | br. oz.              |
| 2699       | Oct. 13 | 35 41 50  | 126 22 20 | 61           | 62            | 34.9         | 2,574  | br. oz.              |
| 2700       | Oct. 13 | 35 37 00  | 126 41 00 | 62           | 62            | 34.9         | 2,569  | br. oz.              |
| 2701       | Oct. 13 | 35 33 00  | 126 59 30 | 62           | 62            | 35           | 2,654  | br. oz.              |
| 2702       | Oct. 13 | 35 28 30  | 127 17 00 | 61           | 62            | 35           | 2,577  | br. oz.              |
| 2703       | Oct. 13 | 35 24 00  | 127 36 00 | 61           | 62            | -----        | 2,533  | bn. oz.              |
| 2704       | Oct. 14 | 35 20 00  | 127 54 00 | 63           | 64            | 35           | 2,600  | bn. oz.              |
| 2705       | Oct. 14 | 35 15 30  | 128 12 00 | 63           | 64            | -----        | 2,701  | bn. oz.              |
| 2706       | Oct. 14 | 35 11 30  | 128 29 00 | 65           | 65            | 35           | 2,666  | bn. oz.              |
| 2707       | Oct. 14 | 35 07 00  | 128 48 30 | 65           | 65            | 35           | 2,720  | bn. oz.              |
| 2708       | Oct. 14 | 35 03 30  | 129 05 00 | 67           | 66            | 35           | 2,645  | bn. oz.              |
| 2709       | Oct. 14 | 34 56 30  | 129 20 00 | 66           | 65            | 35           | 2,689  | bn. oz.              |
| 2710       | Oct. 14 | 34 49 00  | 129 37 00 | 65           | 65            | -----        | 2,607  | (Lost cup.)          |
| 2711       | Oct. 14 | 34 42 00  | 129 52 30 | 64           | 65            | -----        | 2,701  | br. oz.              |
| 2712       | Oct. 15 | 34 35 00  | 130 08 00 | 64           | 64            | 35.1         | 2,751  | br. oz.              |
| 2713       | Oct. 15 | 34 28 00  | 130 24 00 | 63           | 64            | -----        | 2,768  | br. oz.              |
| 2714       | Oct. 15 | 34 21 00  | 130 40 00 | 66           | 65            | -----        | 2,789  | br. oz.              |

a Stations 2655 to 3202, Hawaiian Islands Cable Survey, numbered in Navy report 1 to 556.

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.   |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|---|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Cable Survey, Cali-<br>fornia to Hawai-<br>ian Islands. |           |              |               |              |        |                      |
|            | 1891.   | ° ' "   | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2715       | Oct. 15 | 34 14 00  | 130 56 00 | 67           | 65            | 35.4         | 2,869  | br. oz.              |
| 2716       | Oct. 15 | 34 07 30  | 131 12 00 | 66           | 65            | -----        | 2,895  | br. oz.              |
| 2717       | Oct. 15 | 34 01 00  | 131 28 00 | 66           | 65            | -----        | 2,791  | br. oz.              |
| 2718       | Oct. 15 | 33 54 30  | 131 45 00 | 66           | 65            | 35.4         | 2,772  | br. oz.              |
| 2719       | Oct. 15 | 33 48 30  | 132 01 00 | 66           | 66            | -----        | 2,806  | br. oz.              |
| 2720       | Oct. 16 | 33 41 30  | 134 17 00 | 66           | 66            | -----        | 2,793  | br. oz.              |
| 2721       | Oct. 16 | 33 35 00  | 132 33 30 | 65           | 66            | 35.3         | 2,833  | br. oz.              |
| 2722       | Oct. 16 | 33 28 30  | 132 50 00 | 65           | 67            | -----        | 2,700  | br. oz.              |
| 2723       | Oct. 16 | 33 24 00  | 133 01 00 | 67           | 67            | 35.5         | 2,731  | br. oz.              |
| 2724       | Oct. 16 | 33 20 00  | 133 12 00 | 68           | 67            | -----        | 2,661  | br. oz.              |
| 2725       | Oct. 16 | 33 15 30  | 133 24 00 | 68           | 67            | -----        | 2,662  | br. oz.              |
| 2726       | Oct. 16 | 33 12 00  | 133 34 30 | 68           | 67            | 35.5         | 2,685  | br. m.               |
| 2727       | Oct. 16 | 33 08 00  | 133 46 00 | 67           | 66            | -----        | 2,678  | br. m.               |
| 2728       | Oct. 16 | 33 04 30  | 133 56 30 | 67           | 67            | -----        | 2,670  | br. m. lava.         |
| 2729       | Oct. 16 | 33 01 00  | 134 08 00 | 67           | 67            | 35.1         | 2,641  | br. m. bk. sp.       |
| 2730       | Oct. 16 | 32 57 30  | 134 18 30 | 67           | 66            | -----        | 2,667  | br. m.               |
| 2731       | Oct. 17 | 32 54 00  | 134 30 00 | 67           | 68            | -----        | 2,796  | br. m.               |
| 2732       | Oct. 17 | 32 50 00  | 134 40 30 | 67           | 68            | 35.2         | 2,834  | br. m.               |
| 2733       | Oct. 17 | 32 46 30  | 134 52 00 | 67           | 68            | -----        | 2,461  | br. m.               |
| 2734       | Oct. 17 | 32 46 00  | 134 54 00 | 69           | 68            | 35.3         | 2,322  | br. m. lava.         |
| 2735       | Oct. 17 | 32 44 40  | 134 58 00 | 69           | 68            | -----        | 2,014  | lava.                |
| 2736       | Oct. 17 | 32 44 00  | 135 00 00 | 69           | 68            | -----        | 2,406  | br. m. lava.         |
| 2737       | Oct. 17 | 33 42 00  | 135 05 00 | 69           | 68            | 35.3         | 2,529  | br. m.               |
| 2738       | Oct. 17 | 32 41 30  | 135 07 20 | 69           | 68            | -----        | 2,463  | br. m.               |
| 2739       | Oct. 17 | 32 39 30  | 135 12 00 | 70           | 69            | -----        | 2,463  | br. m.               |
| 2740       | Oct. 17 | 32 35 30  | 135 22 00 | 70           | 69            | 35.2         | 2,375  | br. oz.              |
| 2741       | Oct. 17 | 32 31 00  | 135 33 00 | 69           | 69            | 35           | 2,739  | br. oz.              |
| 2742       | Oct. 17 | 32 27 00  | 135 43 30 | 69           | 69            | -----        | 2,506  | br. oz.              |
| 2743       | Oct. 17 | 32 22 30  | 135 54 00 | 69           | 69            | -----        | 2,442  | br. oz.              |
| 2744       | Oct. 17 | 32 18 00  | 136 04 30 | 69           | 69            | 34.9         | 2,276  | br. oz.              |
| 2745       | Oct. 18 | 32 14 00  | 136 15 00 | 68           | 69            | -----        | 2,557  | br. oz.              |
| 2746       | Oct. 18 | 32 10 00  | 136 26 00 | 69           | 69            | -----        | 2,492  | (Lost cup.)          |
| 2747       | Oct. 18 | 32 05 30  | 136 36 30 | 69           | 69            | 35           | 2,421  | br. oz.              |
| 2748       | Oct. 18 | 32 01 30  | 136 47 30 | 69           | 69            | -----        | 2,417  | br. oz.              |
| 2749       | Oct. 18 | 31 57 00  | 136 58 30 | 62           | 69            | -----        | 2,601  | br. oz.              |
| 2750       | Oct. 18 | 31 52 30  | 137 09 00 | 61           | 68            | 34.9         | 2,547  | br. oz.              |
| 2751       | Oct. 18 | 31 48 00  | 137 19 30 | 63           | 69            | -----        | 2,654  | br. oz.              |
| 2752       | Oct. 18 | 31 43 00  | 137 30 30 | 65           | 69            | -----        | 2,670  | br. oz.              |
| 2753       | Oct. 23 | 36 47 45  | 121 50 54 | 68           | 60            | -----        | 136    | gn. m.               |
| 2754       | Oct. 23 | 36 47 40  | 121 52 10 | 68           | 60            | -----        | 173    | gn. m.               |
| 2755       | Oct. 23 | 36 47 32  | 121 53 20 | 68           | 60            | -----        | 223    | gn. m.               |
| 2756       | Oct. 23 | 36 47 25  | 121 54 35 | 68           | 60            | -----        | 202    | gn. m. s.            |
| 2757       |         |   |           |              |               | Void.        |        |                      |
| 2758       | Oct. 23 | 36 47 20  | 121 55 45 | 68           | 60            | -----        | 277    | gn. m.               |
| 2759       | Oct. 23 | 36 47 10  | 121 57 05 | 63           | 60            | -----        | 302    | gn. m.               |
| 2760       | Oct. 23 | 36 47 10  | 121 58 15 | 64           | 60            | -----        | 255    | gn. m.               |
| 2761       | Oct. 23 | 36 47 10  | 121 59 30 | 63           | 60            | -----        | 418    | gn. m.               |
| 2762       | Oct. 23 | 36 47 10  | 122 00 50 | 63           | 60            | -----        | 502    | gn. m.               |
| 2763       | Oct. 23 | 36 47 10  | 122 02 05 | 60           | 59            | 39.4         | 495    | gn. m.               |
| 2764       | Oct. 23 | 36 47 10  | 122 03 20 | 60           | 59            | -----        | 122    | gy. s.               |
| 2765       | Oct. 23 | 36 47 10  | 122 04 35 | 60           | 59            | -----        | 441    | gn. m. s.            |
| 2766       | Oct. 23 | 36 47 10  | 122 05 50 | 60           | 58            | -----        | 196    | gn. m. s.            |
| 2767       | Oct. 23 | 36 47 10  | 122 07 95 | 60           | 58            | 44.8         | 202    | gn. m. s.            |
| 2768       | Oct. 23 | 36 47 10  | 122 08 20 | 60           | 58            | -----        | 373    | gn. m. s.            |
| 2769       | Oct. 23 | 36 47 10  | 122 09 35 | 59           | 58            | -----        | 440    | gn. m.               |
| 2770       | Oct. 23 | 36 47 10  | 122 10 50 | 59           | 58            | -----        | 271    | fne. gy. s.          |
| 2771       | Oct. 23 | 36 47 10  | 122 12 05 | 59           | 57            | 42           | 291    | gn. m. s.            |
| 2772       | Oct. 23 | 36 47 10  | 122 13 20 | 59           | 58            | -----        | 343    | gn. m. s.            |
| 2773       | Oct. 23 | 36 47 10  | 122 14 35 | 59           | 57            | -----        | 395    | gn. m. s.            |
| 2774       | Oct. 23 | 36 47 10  | 122 15 50 | 59           | 56            | -----        | 469    | gn. m. s.            |
| 2775       | Oct. 23 | 36 47 10  | 122 17 05 | 58           | 56            | 37.7         | 607    | gn. m. s.            |
| 2776       | Oct. 23 | 36 46 10  | 122 18 20 | 58           | 57            | -----        | 621    | gn. m. s.            |
| 2777       | Oct. 23 | 36 47 10  | 122 19 35 | 58           | 56            | -----        | 979    | gn. m. s.            |
| 2778       | Nov. 7  | 33 07 00  | 133 46 15 | 66           | 68            | -----        | 2,239  | bn. m. lava.         |
| 2779       | Nov. 8  | 33 02 30  | 133 57 00 | 66           | 67            | 35.1         | 2,520  | bn. m.               |
| 2780       | Nov. 8  | 32 58 30  | 134 08 30 | 64           | 67            | -----        | 2,648  | bn. oz.              |
| 2781       | Nov. 8  | 32 54 00  | 134 18 30 | 64           | 67            | -----        | 2,512  | bn. oz.              |
| 2782       | Nov. 8  | 32 49 30  | 134 29 30 | 66           | 68            | 35.1         | 2,721  | bn. oz.              |
| 2783       | Nov. 8  | 32 45 00  | 134 40 00 | 66           | 68            | -----        | 2,425  | br. oz. bk. sp.      |
| 2784       | Nov. 8  | 32 43 40  | 134 42 30 | 68           | 68            | 35.1         | 2,442  | br. m. lava.         |
| 2785       | Nov. 8  | 32 41 00  | 134 49 30 | 68           | 68            | -----        | 2,415  | br. m. lava.         |
| 2786       | Nov. 8  | 32 40 00  | 134 51 30 | 69           | 68            | 35.1         | 2,482  | br. m.               |
| 2787       | Nov. 8  | 32 37 30  | 134 57 00 | 69           | 68            | -----        | 2,564  | br. oz.              |
| 2788       | Nov. 8  | 32 35 00  | 135 03 00 | 69           | 68            | -----        | 2,470  | br. oz.              |
| 2789       | Nov. 8  | 32 33 00  | 135 09 00 | 66           | 68            | 35.0         | 2,378  | br. m. lava. sp.     |
| 2790       | Nov. 8  | 32 30 30  | 135 15 00 | 64           | 67            | -----        | 2,441  | br. m.               |
| 2791       | Nov. 9  | 32 26 00  | 135 26 30 | 64           | 67            | -----        | 2,474  | br. m.               |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                                    | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|---|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|   |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Cable Survey, California to Hawaiian Islands. |         |           |           |              |               |              |        |                      |
|   | 1891.   | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2792  | Nov. 9  | 32 21 30  | 135 38 00 | 64           | 67            | -----        | 2,600  | br. m.               |
| 2793  | Nov. 9  | 32 17 00  | 135 49 00 | 65           | 67            | 35.1         | 2,413  | br. m.               |
| 2794  | Nov. 9  | 32 12 30  | 136 00 30 | 67           | 68            | -----        | 2,619  | br. oz.              |
| 2795  | Nov. 9  | 32 08 00  | 136 11 30 | 68           | 68            | -----        | 2,606  | br. oz.              |
| 2796  | Nov. 9  | 32 04 00  | 136 22 30 | 64           | 67            | -----        | 2,484  | (Lost cup.)          |
| 2797  | Nov. 9  | 31 59 30  | 136 33 00 | 64           | 67            | 35.1         | 2,879  | br. oz.              |
| 2798  | Nov. 9  | 31 54 30  | 136 44 00 | 65           | 67            | -----        | 3,186  | (Lost cup.)          |
| 2799  | Nov. 9  | 31 50 00  | 136 54 30 | 65           | 67            | -----        | 2,504  | br. oz.              |
| 2800  | Nov. 9  | 31 45 30  | 137 05 00 | 68           | 68            | 35.1         | 2,591  | br. oz.              |
| 2801  | Nov. 10 | 31 41 00  | 137 15 30 | 68           | 69            | -----        | 2,550  | br. oz.              |
| 2802  | Nov. 10 | 31 36 00  | 137 26 00 | 67           | 69            | -----        | 2,629  | br. oz.              |
| 2803  | Nov. 10 | 31 31 30  | 137 36 30 | 67           | 69            | -----        | 2,614  | br. oz.              |
| 2804  | Nov. 10 | 31 27 00  | 137 47 00 | 67           | 68            | 35.1         | 2,719  | br. oz.              |
| 2805  | Nov. 10 | 31 23 00  | 137 58 00 | 66           | 67            | -----        | 2,700  | br. oz.              |
| 2806  | Nov. 10 | 31 18 30  | 138 08 30 | 70           | 69            | -----        | 2,702  | br. oz.              |
| 2807  | Nov. 10 | 31 14 30  | 138 19 00 | 70           | 69            | -----        | 2,587  | br. oz.              |
| 2808  | Nov. 10 | 31 10 00  | 138 29 30 | 70           | 70            | 35.1         | 2,546  | br. oz.              |
| 2809  | Nov. 10 | 31 05 00  | 138 40 00 | 68           | 70            | -----        | 2,500  | br. oz.              |
| 2810  | Nov. 10 | 31 01 30  | 138 50 00 | 68           | 69            | -----        | 2,412  | br. oz.              |
| 2811  | Nov. 10 | 30 57 30  | 139 00 30 | 68           | 69            | 35.1         | 2,072  | br. oz. s.           |
| 2812  | Nov. 11 | 30 56 30  | 139 02 30 | 69           | 69            | -----        | 2,199  | br. oz.              |
| 2813  | Nov. 11 | 30 52 00  | 139 12 30 | 68           | 69            | -----        | 2,749  | br. oz.              |
| 2814  | Nov. 11 | 30 48 00  | 139 23 00 | 68           | 69            | 35.1         | 2,567  | br. oz.              |
| 2815  | Nov. 11 | 30 44 00  | 139 34 00 | 68           | 69            | -----        | 2,752  | br. oz.              |
| 2816  | Nov. 11 | 30 40 00  | 139 44 30 | 69           | 69            | -----        | 2,646  | br. oz. lava.        |
| 2817  | Nov. 11 | 30 36 00  | 139 55 00 | 70           | 69            | -----        | 2,723  | br. oz. s.           |
| 2818  | Nov. 11 | 30 31 30  | 140 05 30 | 71           | 69            | -----        | 2,637  | br. oz.              |
| 2819  | Nov. 11 | 30 27 00  | 140 16 00 | 72           | 70            | 35.2         | 2,591  | br. oz.              |
| 2820  | Nov. 11 | 30 23 00  | 140 26 30 | 69           | 69            | -----        | 2,650  | br. oz.              |
| 2821  | Nov. 11 | 30 18 00  | 140 38 30 | 69           | 69            | -----        | 2,655  | br. oz.              |
| 2822  | Nov. 11 | 30 13 00  | 140 50 30 | 68           | 69            | 35           | 2,671  | br. oz.              |
| 2823  | Nov. 12 | 30 08 00  | 141 03 00 | 67           | 69            | -----        | 2,691  | br. oz.              |
| 2824  | Nov. 12 | 30 03 00  | 141 15 00 | 68           | 69            | -----        | 2,747  | br. oz.              |
| 2825  | Nov. 12 | 29 58 30  | 141 27 30 | 68           | 67            | 35.2         | 2,720  | br. oz.              |
| 2826  | Nov. 12 | 29 53 30  | 141 40 00 | 69           | 70            | -----        | 2,723  | br. oz.              |
| 2827  | Nov. 12 | 29 48 30  | 141 52 00 | 69           | 70            | 35.2         | 2,738  | br. oz.              |
| 2828  | Nov. 12 | 29 43 00  | 142 04 30 | 72           | 70            | -----        | 2,741  | br. oz.              |
| 2829  | Nov. 12 | 29 38 00  | 142 17 00 | 72           | 70            | -----        | 2,791  | br. oz.              |
| 2830  | Nov. 12 | 29 31 30  | 142 32 00 | 71           | 70            | 35.4         | 2,820  | br. oz.              |
| 2831  | Nov. 12 | 29 25 00  | 142 47 00 | 71           | 70            | -----        | 2,785  | br. oz.              |
| 2832  | Nov. 12 | 29 18 00  | 143 02 00 | 70           | 70            | -----        | 2,827  | br. oz.              |
| 2833  | Nov. 13 | 29 11 30  | 143 17 30 | 71           | 72            | -----        | 2,085  | br. oz.              |
| 2834  | Nov. 13 | 29 10 30  | 143 20 00 | 71           | 72            | 35.1         | 2,280  | br. oz.              |
| 2835  | Nov. 13 | 29 13 00  | 143 15 00 | 70           | 70            | -----        | 2,379  | br. oz.              |
| 2836  | Nov. 13 | 29 15 00  | 143 09 30 | 70           | 70            | -----        | 2,727  | br. oz. lava         |
| 2837  | Nov. 13 | 29 08 30  | 143 25 00 | 70           | 70            | 35.3         | 2,733  | br. oz.              |
| 2838  | Nov. 13 | 29 03 30  | 143 36 00 | 73           | 72            | -----        | 2,744  | br. oz.              |
| 2839  | Nov. 13 | 28 58 00  | 143 48 00 | 72           | 72            | -----        | 2,698  | br. oz.              |
| 2840  | Nov. 13 | 28 52 00  | 144 00 00 | 72           | 72            | 35.3         | 2,784  | br. oz.              |
| 2841  | Nov. 13 | 28 46 00  | 144 12 00 | 72           | 71            | -----        | 2,510  | br. oz.              |
| 2842  | Nov. 13 | 28 45 00  | 144 14 00 | 72           | 71            | -----        | 2,530  | br. oz.              |
| 2843  | Nov. 13 | 28 39 30  | 144 25 30 | 71           | 71            | 35.2         | 2,719  | br. oz.              |
| 2844  | Nov. 13 | 28 33 30  | 144 37 00 | 70           | 71            | -----        | 2,821  | br. oz.              |
| 2845  | Nov. 14 | 28 27 30  | 144 48 30 | 69           | 71            | 35.1         | 2,570  | br. oz. lava.        |
| 2846  | Nov. 14 | 28 26 30  | 143 50 30 | 69           | 71            | -----        | 2,770  | br. oz.              |
| 2847  | Nov. 14 | 28 20 00  | 145 03 30 | 72           | 72            | -----        | 2,801  | br. oz.              |
| 2848  | Nov. 14 | 28 12 20  | 145 13 00 | 72           | 72            | -----        | 2,728  | br. oz.              |
| 2849  | Nov. 14 | 28 06 30  | 145 24 00 | 74           | 72            | -----        | 2,707  | br. oz.              |
| 2850  | Nov. 14 | 28 00 30  | 145 35 00 | 73           | 73            | -----        | 2,635  | br. oz.              |
| 2851  | Nov. 14 | 27 54 00  | 145 45 30 | 72           | 72            | 35.2         | 2,782  | br. oz.              |
| 2852  | Nov. 14 | 27 48 00  | 145 56 30 | 72           | 72            | -----        | 2,848  | br. oz.              |
| 2853  | Nov. 15 | 27 42 00  | 146 07 30 | 72           | 73            | -----        | 2,860  | br. oz.              |
| 2854  | Nov. 15 | 27 36 00  | 146 19 00 | 72           | 73            | 35.4         | 2,910  | br. oz.              |
| 2855  | Nov. 15 | 27 30 00  | 146 30 00 | 72           | 73            | -----        | 2,914  | br. oz.              |
| 2856  | Nov. 15 | 27 24 00  | 146 41 00 | 72           | 73            | -----        | 2,837  | br. oz.              |
| 2857  | Nov. 15 | 27 18 00  | 146 51 30 | 73           | 73            | 35.2         | 2,629  | br. oz.              |
| 2858  | Nov. 15 | 27 12 00  | 147 02 40 | 75           | 74            | -----        | 2,795  | br. oz.              |
| 2859  | Nov. 15 | 27 06 00  | 147 14 00 | 75           | 74            | -----        | 2,929  | br. oz.              |
| 2860  | Nov. 15 | 27 00 00  | 147 25 30 | 75           | 74            | 35.3         | 2,815  | br. oz.              |
| 2861  | Nov. 15 | 26 54 00  | 147 36 30 | 72           | 74            | -----        | 2,896  | br. oz.              |
| 2862  | Nov. 15 | 26 48 00  | 147 47 30 | 72           | 74            | -----        | 2,896  | br. oz.              |
| 2863  | Nov. 15 | 26 42 00  | 147 59 00 | 71           | 74            | 35.3         | 2,925  | br. oz.              |
| 2864  | Nov. 16 | 26 35 30  | 148 10 00 | 71           | 74            | -----        | 2,894  | br. oz.              |
| 2865  | Nov. 16 | 26 29 00  | 148 21 30 | 71           | 74            | -----        | 2,942  | br. oz.              |
| 2866  | Nov. 16 | 26 23 00  | 148 33 00 | 72           | 74            | 35.3         | 2,985  | br. oz.              |
| 2867  | Nov. 16 | 26 17 00  | 148 44 00 | 73           | 75            | -----        | 3,003  | br. oz.              |
| 2868  | Nov. 16 | 26 10 15  | 148 55 00 | 73           | 75            | -----        | 2,864  | br. oz.              |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.   |           | Temperature. |               |              | Depth. | Character of bottom.          |
|------------|---------|---|-----------|--------------|---------------|--------------|--------|-------------------------------|
|            |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                               |
|            |         | Cable Survey, Cali-<br>fornia to Hawai-<br>ian Islands. |           |              |               |              |        |                               |
|            | 1891.   | ° ' "   | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                               |
| 2869       | Nov. 16 | 26 04 30  | 149 06 30 | 75           | 75            | 35.3         | 2,992  | br. oz.                       |
| 2870       | Nov. 16 | 25 58 00  | 149 18 30 | 74           | 75            | -----        | 3,039  | br. oz.                       |
| 2871       | Nov. 16 | 25 52 00  | 149 30 00 | 74           | 75            | -----        | 3,008  | br. oz.                       |
| 2872       | Nov. 16 | 25 46 00  | 149 41 30 | 74           | 75            | 35.3         | 2,982  | br. oz.                       |
| 2873       | Nov. 17 | 25 39 30  | 149 53 00 | 74           | 74            | -----        | 3,037  | br. oz.                       |
| 2874       | Nov. 17 | 25 33 00  | 150 05 00 | 73           | 74            | -----        | 2,993  | br. oz.                       |
| 2875       | Nov. 17 | 25 26 30  | 150 16 30 | 73           | 74            | 35.4         | 3,027  | br. oz.                       |
| 2876       | Nov. 17 | 25 20 00  | 150 28 00 | 73           | 74            | -----        | 3,073  | (Lost cup.)                   |
| 2877       | Nov. 17 | 25 14 00  | 150 39 00 | 73           | 74            | -----        | 2,952  | br. oz.                       |
| 2878       | Nov. 17 | 25 08 00  | 150 50 00 | 75           | 75            | 35.3         | 2,910  | br. oz.                       |
| 2879       | Nov. 17 | 25 02 00  | 151 01 00 | 75           | 75            | -----        | 2,978  | br. oz.                       |
| 2880       | Nov. 17 | 24 56 00  | 151 13 00 | 75           | 75            | -----        | 2,910  | br. oz.                       |
| 2881       | Nov. 17 | 24 50 00  | 151 24 30 | 74           | 75            | 35.4         | 2,985  | br. oz.                       |
| 2882       | Nov. 17 | 24 43 30  | 151 36 00 | 74           | 75            | -----        | 2,936  | br. oz.                       |
| 2883       | Nov. 18 | 24 37 00  | 151 47 30 | 75           | 75            | -----        | 3,023  | br. oz. lava.                 |
| 2884       | Nov. 18 | 24 31 00  | 151 59 30 | 75           | 76            | 35.3         | 2,917  | br. oz.                       |
| 2885       | Nov. 18 | 24 24 30  | 152 11 30 | 76           | 76            | -----        | 2,959  | br. oz.                       |
| 2886       | Nov. 18 | 24 18 00  | 152 22 30 | 76           | 76            | -----        | 2,950  | (No specimen; defective cup.) |
| 2887       | Nov. 18 | 24 11 30  | 152 34 00 | 76           | 76            | 35.4         | 2,953  | br. oz.                       |
| 2888       |         |   |           |              |               | Void.        |        |                               |
| 2889       | Nov. 18 | 24 06 00  | 152 46 00 | 76           | 76            | -----        | 2,907  | br. oz. s.                    |
| 2890       | Nov. 18 | 24 00 30  | 152 57 00 | 76           | 76            | -----        | 2,864  | br. oz. s.                    |
| 2891       | Nov. 18 | 23 55 00  | 153 08 30 | 76           | 76            | 35.4         | 2,811  | br. oz.                       |
| 2892       | Nov. 18 | 23 49 00  | 153 20 00 | 75           | 74            | -----        | 2,801  | (No specimen; defective cup.) |
| 2893       | Nov. 18 | 23 43 00  | 153 31 30 | 75           | 74            | -----        | 2,748  | br. oz.                       |
| 2894       | Nov. 19 | 23 37 30  | 153 43 00 | 75           | 75            | 35.3         | 2,627  | (No specimen; defective cup.) |
| 2895       | Nov. 19 | 23 32 00  | 153 54 00 | 75           | 76            | -----        | 2,610  | br. oz.                       |
| 2896       | Nov. 19 | 23 26 00  | 154 06 00 | 76           | 76            | 35.3         | 2,600  | br. oz.                       |
| 2897       | Nov. 19 | 23 20 00  | 154 17 30 | 76           | 76            | -----        | 2,453  | br. oz.                       |
| 2898       | Nov. 19 | 23 14 30  | 154 28 30 | 76           | 76            | -----        | 1,265  | br. oz.                       |
| 2899       | Nov. 19 | 23 13 30  | 154 30 00 | 76           | 76            | 35.4         | 1,531  | br. oz.                       |
| 2900       | Nov. 19 | 23 15 30  | 154 27 00 | 77           | 76            | -----        | 1,663  | br. oz.                       |
| 2901       | Nov. 19 | 23 17 30  | 154 23 30 | 78           | 77            | -----        | 2,502  | br. oz.                       |
| 2902       | Nov. 19 | 23 11 00  | 154 34 00 | 78           | 77            | 35.5         | 1,783  | gy. oz.                       |
| 2903       | Nov. 19 | 23 05 00  | 154 42 30 | 78           | 77            | -----        | 2,411  | (No specimen; defective cup.) |
| 2904       | Nov. 19 | 23 00 30  | 154 51 00 | 77           | 77            | -----        | 2,464  | br. oz.                       |
| 2905       | Nov. 19 | 22 55 30  | 154 59 00 | 77           | 77            | 35.3         | 2,368  | br. oz. lava.                 |
| 2906       | Nov. 20 | 22 49 30  | 155 09 00 | 76           | 76            | -----        | 2,420  | br. oz.                       |
| 2907       | Nov. 20 | 22 43 30  | 155 18 30 | 75           | 76            | -----        | 2,272  | br. oz.                       |
| 2908       | Nov. 20 | 22 42 30  | 155 20 30 | 75           | 76            | 35.5         | 2,341  | br. oz.                       |
| 2909       | Nov. 20 | 22 36 30  | 155 30 30 | 75           | 76            | -----        | 2,408  | br. oz.                       |
| 2910       | Nov. 20 | 22 30 00  | 155 40 00 | 75           | 76            | -----        | 2,426  | br. oz.                       |
| 2911       | Nov. 20 | 22 24 30  | 155 49 00 | 75           | 76            | 32.4         | 2,468  | br. oz.                       |
| 2912       | Nov. 20 | 22 18 00  | 155 58 30 | 77           | 77            | -----        | 2,542  | br. m.                        |
| 2913       | Nov. 20 | 22 11 00  | 156 09 00 | 77           | 77            | 35.4         | 2,640  | br. m.                        |
| 2914       | Nov. 20 | 22 03 30  | 156 19 00 | 78           | 77            | -----        | 2,766  | br. m.                        |
| 2915       | Nov. 20 | 21 55 30  | 156 29 30 | 78           | 77            | -----        | 2,868  | br. m.                        |
| 2916       | Nov. 20 | 21 47 30  | 156 39 00 | 77           | 77            | 35.3         | 2,878  | br. m.                        |
| 2917       | Nov. 21 | 21 39 00  | 156 48 30 | 76           | 77            | -----        | 2,615  | br. m. fne. s.                |
| 2918       | Nov. 21 | 21 37 30  | 156 50 00 | 76           | 77            | -----        | 2,576  | br. m. fne. s.                |
| 2919       | Nov. 21 | 21 29 30  | 156 59 30 | 75           | 77            | 35.5         | 2,056  | br. m. fne. s.                |
| 2920       | Nov. 21 | 21 21 00  | 157 09 00 | 76           | 77            | -----        | 570    | br. m. fne. s.                |
| 2921       | Nov. 21 | 21 19 00  | 157 13 30 | 76           | 77            | -----        | 347    | br. m. fne. s.                |
| 2922       | Nov. 21 | 21 18 30  | 157 19 00 | 76           | 77            | 44.8         | 268    | gy. s.                        |
| 2923       | Nov. 21 | 21 18 00  | 157 24 30 | 77           | 78            | -----        | 392    | gy. s.                        |
| 2924       | Nov. 21 | 21 16 48  | 157 30 00 | 77           | 78            | -----        | 301    | gy. s. co.                    |
| 2925       | Nov. 21 | 21 15 24  | 157 35 05 | 77           | 78            | -----        | 105    | gy. s. co.                    |
| 2926       | Nov. 21 | 21 13 38  | 157 39 32 | 78           | 78            | 43.8         | 304    | fne. wh. s.                   |
| 2927       | Nov. 21 | 21 12 50  | 157 44 32 | 78           | 78            | -----        | 293    | m.                            |
| 2928       | Nov. 21 | 21 13 00  | 157 50 20 | 78           | 78            | -----        | 295    | fne. wh. s.                   |
| 2929       | Dec. 2  | 21 15 13  | 157 50 58 | 79           | 78            | -----        | 10     | (No specimen.)                |
| 2930       | Dec. 2  | 21 15 30  | 157 40 56 | 76           | 75            | -----        | 22     | wh. s. co.                    |
| 2931       | Dec. 2  | 21 15 20  | 157 40 28 | 76           | 75            | -----        | 47     | s. brk. sh.                   |
| 2932       | Dec. 2  | 21 14 59  | 157 40 10 | 76           | 75            | -----        | 189    | fne. wh. s.                   |
| 2933       | Dec. 2  | 21 14 38  | 157 39 53 | 76           | 75            | -----        | 276    | wh. s.                        |
| 2934       | Dec. 2  | 21 14 16  | 157 39 40 | 76           | 75            | -----        | 285    | fne. wh. s.                   |
| 2935       | Dec. 2  | 21 14 02  | 157 39 28 | 76           | 75            | -----        | 303    | s. co.                        |
| 2936       | Dec. 2  | 21 13 55  | 157 41 23 | 76           | 75            | -----        | 255    | fne. wh. s. lava.             |
| 2937       | Dec. 2  | 21 14 06  | 157 42 42 | 76           | 75            | -----        | 47     | wh. s. co.                    |
| 2938       | Dec. 2  | 21 14 30  | 157 43 24 | 76           | 75            | -----        | 142    | fne. wh. s.                   |
| 2939       | Dec. 2  | 21 14 56  | 157 44 05 | 76           | 75            | -----        | 21     | wh. s. sh. co.                |
| 2940       | Dec. 2  | 21 15 32  | 157 44 32 | 76           | 75            | -----        | 10     | wh. s.                        |
| 2941       | Dec. 2  | 21 15 49  | 157 44 27 | 76           | 75            | -----        | 7      | wh. s.                        |
| 2942       | Dec. 3  | 21 15 54  | 157 44 22 | 74           | 77            | -----        | 74     | wh. s.                        |
| 2943       | Dec. 3  | 21 15 57  | 157 44 20 | 74           | 77            | -----        | 74     | wh. s.                        |
| 2944       | Dec. 3  | 21 16 01  | 157 44 17 | 74           | 77            | -----        | 61     | wh. s.                        |
| 2945       | Dec. 3  | 21 16 05  | 157 44 14 | 74           | 77            | -----        | 6      | wh. s.                        |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.                                   | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|--|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|  |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Cable Survey, California to Hawaiian Islands |         |           |           |              |               |              |        |                      |
| 1891.  |         | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 2946   | Dec. 3  | 21 16 08  | 157 44 10 | 74           | 77            |              | 4.25   | wh. s.               |
| 2947   | Dec. 3  | 21 16 11  | 157 44 06 | 74           | 77            |              | 4      | wh. s.               |
| 2948   | Dec. 3  | 21 16 14  | 157 44 01 | 74           | 77            |              | 5      | wh. s.               |
| 2949   | Dec. 3  | 21 16 18  | 157 43 56 | 74           | 77            |              | 2.75   | wh. s.               |
| 2950   | Dec. 3  | 21 15 40  | 157 43 47 | 75           | 77            |              | 7.5    | wh. s. sh. co.       |
| 2951   | Dec. 3  | 21 15 48  | 157 43 49 | 76           | 77            |              | 7.5    | wh. s.               |
| 2952   | Dec. 3  | 21 15 56  | 157 43 50 | 76           | 77            |              | 6      | wh. s.               |
| 2953   | Dec. 3  | 21 16 04  | 157 43 51 | 76           | 77            |              | 5.25   | wh. s.               |
| 2954   | Dec. 3  | 21 16 12  | 157 43 52 | 76           | 77            |              | 3.25   | wh. s.               |
| 2955   | Dec. 3  | 21 16 19  | 157 43 55 | 76           | 77            |              | 2.25   | wh. s.               |
| 2956   | Dec. 3  | 21 15 08  | 157 43 46 | 75           | 76            |              | 13     | wh. s. co.           |
| 2957   | Dec. 3  | 21 14 37  | 157 43 45 | 75           | 76            |              | 53     | wh. s. co.           |
| 2958   | Dec. 3  | 21 14 06  | 157 43 43 | 75           | 76            |              | 222    | fne. wh. s.          |
| 2959   | Dec. 3  | 21 13 30  | 157 43 40 | 75           | 76            | 45.3         | 275    | fne. wh. s.          |
| 2960   | Dec. 3  | 21 15 49  | 157 41 23 | 76           | 76            |              | 10.5   | rky.                 |
| 2961   | Dec. 3  | 21 15 52  | 157 41 28 | 76           | 76            |              | 7.25   | bk. s.               |
| 2962   | Dec. 3  | 21 15 54  | 157 41 32 | 76           | 76            |              | 6      | bk. s.               |
| 2963   | Dec. 3  | 21 15 57  | 157 41 37 | 76           | 76            |              | 3.75   | rky.                 |
| 2964   | Dec. 3  | 21 15 58  | 157 41 40 | 76           | 76            |              | 2.25   | wh. s. p.            |
| 2965   | Dec. 3  | 21 15 40  | 157 43 47 | 76           | 76            |              | 7      | wh. s. co.           |
| 2966   | Dec. 3  | 21 15 08  | 157 51 01 | 76           | 75            |              | 12.5   | wh. s. co.           |
| 2967   | Dec. 3  | 21 15 13  | 157 50 58 | 76           | 75            |              | 10.25  | wh. s.               |
| 2968   | Dec. 3  | 21 15 17  | 157 50 46 | 76           | 75            |              | 8.75   | wh. s.               |
| 2969   | Dec. 3  | 21 15 18  | 157 50 39 | 76           | 75            |              | 7      | wh. s.               |
| 2970   | Dec. 3  | 21 15 21  | 157 50 31 | 76           | 75            |              | 2.75   | wh. s.               |
| 2971   | Dec. 3  | 21 15 24  | 157 50 27 | 76           | 75            |              | 2      | wh. s. co.           |
| 2972   | Dec. 3  | 21 15 27  | 157 50 22 | 76           | 75            |              | 2      | wh. s. co.           |
| 2973   | Dec. 3  | 21 15 22  | 157 51 48 | 75           | 76            |              | 7.25   | co.                  |
| 2974   | Dec. 3  | 21 15 23  | 157 50 43 | 75           | 76            |              | 5      | wh. s.               |
| 2975   | Dec. 3  | 21 15 24  | 157 50 39 | 75           | 76            |              | 3      | wh. s.               |
| 2976   | Dec. 3  | 21 15 25  | 157 50 32 | 75           | 76            |              | 2      | wh. s.               |
| 2977   | Dec. 3  | 21 16 09  | 157 50 38 | 75           | 75            |              | 0.75   | wh. s.               |
| 2978   | Dec. 3  | 21 15 59  | 157 50 42 | 75           | 75            |              | 2.75   | wh. s.               |
| 2979   | Dec. 3  | 21 15 52  | 157 50 44 | 75           | 75            |              | 3.75   | wh. s.               |
| 2980   | Dec. 3  | 21 15 46  | 157 50 46 | 75           | 75            |              | 5      | wh. s.               |
| 2981   | Dec. 3  | 21 15 40  | 157 50 49 | 75           | 75            |              | 4.25   | wh. s.               |
| 2982   | Dec. 3  | 21 15 35  | 157 50 51 | 75           | 75            |              | 5.75   | wh. s.               |
| 2983   | Dec. 3  | 21 15 30  | 157 50 54 | 76           | 76            |              | 7.25   | co.                  |
| 2984   | Dec. 3  | 21 14 53  | 157 51 10 | 77           | 76            |              | 50     | wh. s. bk. sp.       |
| 2985   | Dec. 3  | 21 14 27  | 157 51 22 | 77           | 76            |              | 206    | fne. wh. s.          |
| 2986   | Dec. 3  | 21 13 57  | 157 51 29 | 77           | 76            |              | 271    | fne. wh. s.          |
| 2987   | Dec. 3  | 21 13 17  | 157 48 29 | 77           | 76            | 48.1         | 224    | fne. wh. s.          |
| 2988   | Dec. 3  | 21 13 32  | 157 48 52 | 77           | 76            |              | 133    | wh. s. sh. co.       |
| 2989   | Dec. 3  | 21 13 48  | 157 49 29 | 77           | 76            |              | 164    | wh. s. co.           |
| 2990   | Dec. 3  | 21 14 00  | 157 49 58 | 77           | 76            | 50.4         | 201    | fne. wh. s.          |
| 2991   | Dec. 4  | 21 14 26  | 157 50 49 | 77           | 76            |              | 252    | fne. wh. s.          |
| 2992   | Dec. 4  | 21 14 40  | 157 51 17 | 77           | 76            |              | 153    | fne. wh. s.          |
| 2993   | Dec. 5  | 21 14 30  | 157 34 30 | 76           | 76            |              | 153    | fne. wh. s. co.      |
| 2994   | Dec. 5  | 21 15 00  | 157 33 00 | 76           | 76            | 44.3         | 305    | fne. wh. s.          |
| 2995   | Dec. 5  | 21 18 00  | 157 29 00 | 76           | 76            |              | 308    | fne. wh. s.          |
| 2996   | Dec. 5  | 21 20 30  | 157 25 00 | 76           | 76            |              | 407    | fne. gy. s.          |
| 2997   | Dec. 5  | 21 23 30  | 157 21 00 | 77           | 76            | 50.7         | 372    | gy. s. co.           |
| 2998   | Dec. 5  | 21 26 00  | 157 17 00 | 77           | 76            |              | 508    | fne. gy. s.          |
| 2999   | Dec. 5  | 21 27 00  | 157 15 00 | 77           | 76            |              | 549    | fne. gy. s.          |
| 3000   | Dec. 5  | 21 29 30  | 157 12 00 | 77           | 76            |              | 1,557  | gy. m. fne. s.       |
| 3001   | Dec. 5  | 21 32 30  | 157 08 00 | 76           | 74            | 35.1         | 1,792  | gy. m. fne. s.       |
| 3002   | Dec. 5  | 21 35 00  | 157 04 00 | 75           | 75            |              | 2,156  | br. m. fne. s.       |
| 3003   | Dec. 5  | 21 40 30  | 156 56 00 | 75           | 75            |              | 1,951  | br. m. lava.         |
| 3004   | Dec. 5  | 21 41 20  | 156 54 00 | 75           | 75            | 35.1         | 2,325  | fne. s. lava.        |
| 3005   | Dec. 5  | 21 47 00  | 156 46 00 | 75           | 75            |              | 2,612  | br. m. s.            |
| 3006   | Dec. 12 | 21 18 00  | 157 23 00 | 68           | 74            | 42.5         | 329    | wh. and gy. s.       |
| 3007   | Dec. 12 | 21 20 00  | 157 19 00 | 68           | 74            |              | 323    | fne. gy. s.          |
| 3008   | Dec. 12 | 21 23 00  | 157 14 30 | 72           | 74            |              | 547    | gy. m. fne. s.       |
| 3009   | Dec. 12 | 21 24 00  | 157 12 00 | 72           | 74            |              | 603    | gy. m. fne. s.       |
| 3010   | Dec. 12 | 21 25 00  | 157 10 00 | 72           | 74            | 36.1         | 1,116  | gy. m. fne. s.       |
| 3011   | Dec. 12 | 21 26 17  | 157 08 30 | 72           | 74            |              | 1,781  | (No specimen.)       |
| 3012   | Dec. 12 | 21 28 30  | 157 04 00 | 70           | 73            |              | 2,067  | br. m. fne. s.       |
| 3013   | Dec. 12 | 21 32 30  | 156 54 00 | 70           | 73            | 35.3         | 1,807  | br. m. s.            |
| 3014   | Dec. 12 | 21 36 30  | 156 44 00 | 71           | 74            |              | 2,767  | br. m. fne. s.       |
| 3015   | Dec. 12 | 21 41 00  | 156 32 30 | 68           | 73            |              | 2,966  | br. m. fne. s.       |
| 3016   | Dec. 12 | 21 46 00  | 156 21 00 | 69           | 73            | 35.3         | 3,017  | br. m. fne. s.       |
| 3017   | Dec. 13 | 21 51 00  | 156 09 00 | 70           | 73            |              | 3,027  | (No specimen.)       |
| 3018   | Dec. 13 | 21 56 00  | 155 57 30 | 69           | 74            |              | 2,915  | br. oz.              |
| 3019   | Dec. 13 | 22 00 30  | 155 46 00 | 73           | 75            | 35.2         | 2,782  | br. oz.              |
| 3020   | Dec. 13 | 22 05 30  | 155 34 30 | 74           | 74            |              | 2,654  | br. oz.              |
| 3021   | Dec. 13 | 22 10 00  | 155 23 30 | 74           | 75            |              | 2,545  | br. oz.              |
| 3022   | Dec. 13 | 22 15 00  | 155 12 30 | 72           | 75            | 35.2         | 2,475  | br. oz.              |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.   |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|---|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Cable Survey, Cali-<br>fornia to Hawai-<br>ian Islands. |           |              |               |              |        |                      |
|            | 1891.   | ° ' "   | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 3023       | Dec. 13 | 22 20 00  | 155 01 00 | 72           | 75            |              | 2,463  | br. oz.              |
| 3024       | Dec. 13 | 22 25 00  | 154 49 30 | 71           | 74            |              | 2,477  | br. oz.              |
| 3025       | Dec. 14 | 22 30 00  | 154 38 30 | 71           | 75            | 35.3         | 2,485  | br. oz.              |
| 3026       | Dec. 14 | 22 35 00  | 154 27 00 | 69           | 74            |              | 2,453  | br. oz.              |
| 3027       | Dec. 14 | 22 40 00  | 154 16 00 | 69           | 74            |              | 2,500  | br. oz.              |
| 3028       | Dec. 14 | 22 45 00  | 154 04 30 | 73           | 74            | 35.7         | 2,587  | br. oz.              |
| 3029       | Dec. 14 | 22 50 00  | 153 53 00 | 74           | 74            |              | 2,555  | br. oz.              |
| 3030       | Dec. 14 | 22 55 30  | 153 42 00 | 74           | 74            |              | 2,602  | br. oz.              |
| 3031       | Dec. 14 | 23 01 00  | 153 31 00 | 73           | 74            | 35.2         | 2,649  | br. oz.              |
| 3032       | Dec. 14 | 23 06 00  | 153 20 30 | 72           | 74            |              | 2,696  | br. oz.              |
| 3033       | Dec. 14 | 23 11 00  | 153 09 30 | 72           | 74            |              | 2,822  | br. oz.              |
| 3034       | Dec. 14 | 23 16 00  | 152 59 00 | 72           | 74            | 35.2         | 2,827  | br. oz.              |
| 3035       | Dec. 15 | 23 21 30  | 152 48 00 | 70           | 73            |              | 2,910  | br. oz.              |
| 3036       | Dec. 15 | 23 27 00  | 152 37 00 | 70           | 73            |              | 2,894  | br. oz. s.           |
| 3037       | Dec. 15 | 23 32 30  | 152 26 00 | 70           | 74            | 35.2         | 2,927  | br. oz. s.           |
| 3038       | Dec. 15 | 23 38 00  | 152 15 00 | 71           | 74            |              | 3,006  | br. oz.              |
| 3039       | Dec. 15 | 23 43 30  | 152 05 00 | 69           | 74            |              | 2,976  | br. oz.              |
| 3040       | Dec. 15 | 23 49 00  | 151 55 00 | 70           | 74            | 41.1         | 2,985  | br. oz.              |
| 3041       | Dec. 15 | 23 56 00  | 151 42 00 | 69           | 74            | 38.9         | 3,030  | br. oz.              |
| 3042       | Dec. 16 | 24 03 00  | 151 29 30 | 69           | 73            |              | 3,016  | (No specimen.)       |
| 3043       | Dec. 16 | 24 10 00  | 151 17 00 | 70           | 73            |              | 3,038  | br. oz.              |
| 3044       | Dec. 16 | 24 17 00  | 151 04 00 | 70           | 73            |              | 2,979  | br. oz.              |
| 3045       | Dec. 16 | 24 24 00  | 150 51 30 | 71           | 73            | 35.3         | 2,907  | br. oz.              |
| 3046       | Dec. 16 | 24 31 00  | 150 37 00 | 74           | 74            |              | 2,747  | br. oz.              |
| 3047       | Dec. 16 | 24 37 00  | 150 23 00 | 72           | 73            |              | 2,916  | br. oz.              |
| 3048       | Dec. 16 | 24 43 00  | 150 09 00 | 71           | 72            | 37.6         | 2,980  | br. oz.              |
| 3049       | Dec. 16 | 24 49 00  | 149 55 00 | 72           | 73            |              | 2,912  | br. oz.              |
| 3050       | Dec. 17 | 24 55 00  | 149 41 00 | 70           | 73            |              | 2,984  | br. oz.              |
| 3051       | Dec. 17 | 25 01 00  | 149 27 00 | 71           | 73            | 35.4         | 3,034  | br. oz.              |
| 3052       | Dec. 17 | 25 07 30  | 149 13 00 | 71           | 73            |              | 2,957  | br. oz.              |
| 3053       | Dec. 17 | 25 13 30  | 148 59 00 | 72           | 73            |              | 2,930  | br. oz.              |
| 3054       | Dec. 17 | 25 20 00  | 148 44 30 | 71           | 73            |              | 2,938  | (No specimen.)       |
| 3055       | Dec. 17 | 25 26 30  | 148 30 00 | 69           | 73            | 35           | 2,881  | br. oz.              |
| 3056       | Dec. 17 | 25 33 00  | 148 16 00 | 69           | 73            |              | 2,642  | (No specimen.)       |
| 3057       | Dec. 17 | 25 39 30  | 148 01 30 | 69           | 73            |              | 2,903  | br. oz.              |
| 3058       | Dec. 18 | 25 46 00  | 147 47 00 | 69           | 72            | 35.1         | 2,893  | br. oz.              |
| 3059       | Dec. 18 | 25 53 00  | 147 32 30 | 69           | 72            |              | 2,923  | br. oz.              |
| 3060       | Dec. 18 | 26 00 00  | 147 18 00 | 72           | 72            |              | 2,787  | (No specimen.)       |
| 3061       | Dec. 18 | 26 06 36  | 147 03 16 | 72           | 72            | 35.2         | 2,884  | br. oz.              |
| 3062       | Dec. 18 | 26 15 00  | 146 49 00 | 74           | 73            |              | 2,838  | br. oz.              |
| 3063       | Dec. 18 | 26 19 30  | 146 34 30 | 71           | 72            |              | 2,777  | br. oz.              |
| 3064       | Dec. 18 | 26 26 00  | 146 20 00 | 69           | 72            | 35.1         | 2,829  | br. oz.              |
| 3065       | Dec. 19 | 26 32 30  | 146 05 30 | 68           | 71            |              | 2,779  | br. oz.              |
| 3066       | Dec. 19 | 26 39 00  | 145 51 00 | 68           | 72            |              | 2,854  | br. oz.              |
| 3067       | Dec. 19 | 26 45 00  | 145 36 30 | 68           | 72            | 35.1         | 2,846  | br. oz.              |
| 3068       | Dec. 19 | 26 44 00  | 145 38 30 | 69           | 72            |              | 2,682  | br. oz.              |
| 3069       | Dec. 19 | 26 46 00  | 145 33 30 | 70           | 72            |              | 2,677  | br. oz.              |
| 3070       | Dec. 19 | 26 50 30  | 145 24 00 | 69           | 72            |              | 2,825  | br. oz.              |
| 3071       | Dec. 19 | 26 57 00  | 145 09 30 | 69           | 72            | 35.1         | 2,739  | br. oz.              |
| 3072       | Dec. 19 | 27 03 30  | 144 54 30 | 68           | 71            |              | 2,714  | br. oz.              |
| 3073       | Dec. 20 | 27 10 00  | 144 39 30 | 66           | 71            |              | 2,697  | br. oz.              |
| 3074       | Dec. 20 | 27 16 30  | 144 24 30 | 68           | 70            | 35.2         | 2,750  | br. oz.              |
| 3075       | Dec. 20 | 27 23 00  | 144 10 00 | 68           | 70            |              | 2,506  | br. oz.              |
| 3076       | Dec. 20 | 27 33 00  | 143 55 30 | 67           | 70            |              | 2,716  | br. oz.              |
| 3077       | Dec. 20 | 27 42 30  | 143 41 30 | 67           | 70            | 35           | 2,375  | br. oz.              |
| 3078       | Dec. 21 | 27 52 00  | 143 27 00 | 67           | 70            |              | 2,827  | br. oz.              |
| 3079       | Dec. 21 | 28 02 00  | 143 12 30 | 69           | 70            |              | 2,736  | br. oz.              |
| 3080       | Dec. 21 | 28 08 00  | 142 57 00 | 69           | 71            |              | 2,731  | br. oz.              |
| 3081       | Dec. 21 | 28 14 00  | 142 40 00 | 65           | 69            | 35.1         | 2,560  | br. oz.              |
| 3082       | Dec. 22 | 28 20 00  | 142 22 30 | 67           | 69            |              | 2,684  | br. oz.              |
| 3083       | Dec. 22 | 28 26 00  | 142 05 00 | 67           | 69            |              | 2,711  | br. oz.              |
| 3084       | Dec. 22 | 28 31 30  | 141 47 30 | 69           | 69            | 35.1         | 2,668  | br. oz. lava.        |
| 3085       | Dec. 22 | 28 37 30  | 141 33 00 | 69           | 69            |              | 2,678  | br. oz. lava.        |
| 3086       | Dec. 22 | 28 43 00  | 141 19 00 | 68           | 69            |              | 2,700  | br. oz.              |
| 3087       | Dec. 23 | 28 48 30  | 141 04 30 | 68           | 69            | 35.1         | 2,702  | br. oz.              |
| 3088       | Dec. 23 | 28 54 30  | 140 49 30 | 66           | 69            |              | 2,735  | (No specimen.)       |
| 3089       | Dec. 23 | 29 00 30  | 140 35 00 | 66           | 68            |              | 2,664  | br. oz.              |
| 3090       | Dec. 23 | 29 06 24  | 140 28 48 | 68           | 69            | 35.1         | 2,741  | br. oz.              |
| 3091       | Dec. 23 | 29 12 00  | 140 06 30 | 65           | 68            |              | 2,729  | br. oz.              |
| 3092       | Dec. 23 | 29 17 30  | 139 52 00 | 65           | 68            |              | 2,687  | br. oz.              |
| 3093       | Dec. 24 | 29 23 00  | 139 38 00 | 64           | 68            | 35.1         | 2,631  | br. oz.              |
| 3094       | Dec. 24 | 29 28 30  | 139 23 30 | 64           | 68            |              | 2,608  | br. oz.              |
| 3095       | Dec. 24 | 29 34 00  | 139 09 00 | 63           | 68            |              | 2,668  | br. oz.              |
| 3096       | Dec. 24 | 29 40 00  | 138 55 00 | 64           | 67            | 35.1         | 2,620  | br. oz.              |
| 3097       | Dec. 24 | 29 46 00  | 138 40 00 | 66           | 68            |              | 2,572  | br. oz.              |
| 3098       | Dec. 24 | 29 52 30  | 138 24 00 | 63           | 67            |              | 2,653  | br. oz.              |
| 3099       | Dec. 24 | 29 59 00  | 138 08 00 | 63           | 67            | 35.1         | 2,556  | br. oz. lava.        |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                                    | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|---|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|   |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Cable Survey, California to Hawaiian Islands. |         |           |           |              |               |              |        |                      |
| 1891.   |         |           |           |              |               |              |        |                      |
| 3100  | Dec. 24 | 30 05 30  | 137 52 00 | 62           | 67            |              | 2,404  | br. oz. lava.        |
| 3101  | Dec. 25 | 30 12 00  | 137 36 30 | 63           | 66            |              | 2,672  | br. oz. lava.        |
| 3102  | Dec. 25 | 30 18 30  | 137 21 00 | 61           | 65            | 35.1         | 2,626  | br. oz.              |
| 3103  | Dec. 25 | 30 23 30  | 137 09 00 | 61           | 66            |              | 2,201  | br. oz. lava.        |
| 3104  | Dec. 25 | 30 24 00  | 137 07 00 | 62           | 66            | 35           | 1,924  | No specimen.         |
| 3105  | Dec. 25 | 30 25 00  | 137 05 00 | 62           | 66            |              | 2,023  | gy. oz. fine s.      |
| 3106  | Dec. 25 | 30 26 00  | 137 03 00 | 63           | 66            |              | 2,248  | No specimen.         |
| 3107  | Dec. 25 | 30 27 00  | 137 00 30 | 63           | 66            | 35.2         | 2,604  | br. oz. s. lava.     |
| 3108  | Dec. 25 | 30 30 01  | 137 05 06 | 64           | 67            |              | 2,521  | br. oz.              |
| 3109  | Dec. 25 | 30 29 30  | 137 10 30 | 64           | 67            | 33.2         | 2,422  | br. oz.              |
| 3110  | Dec. 25 | 30 25 00  | 137 15 00 | 64           | 67            |              | 1,779  | gy. oz. fine s.      |
| 3111  | Dec. 25 | 30 19 30  | 137 15 00 | 64           | 67            |              | 2,298  | br. oz. lava.        |
| 3112  | Dec. 25 | 30 15 00  | 137 10 30 | 65           | 66            | 35.1         | 2,309  | No specimen.         |
| 3113  | Dec. 25 | 30 15 30  | 137 04 30 | 63           | 66            |              | 2,551  | br. oz.              |
| 3114  | Dec. 25 | 30 19 30  | 137 00 30 | 62           | 60            |              | 2,573  | br. oz. lava.        |
| 3115  | Dec. 25 | 30 28 00  | 136 53 00 | 62           | 66            | 35           | 2,291  | br. oz. lava.        |
| 3116  | Dec. 25 | 30 29 00  | 136 51 00 | 62           | 66            |              | 1,932  | br. oz.              |
| 3117  | Dec. 26 | 30 30 00  | 136 49 00 | 62           | 66            |              | 1,858  | br. oz.              |
| 3118  | Dec. 26 | 30 31 00  | 136 47 00 | 62           | 66            |              | 2,131  | br. oz.              |
| 3119  | Dec. 26 | 30 33 00  | 136 42 30 | 62           | 66            |              | 2,220  | br. oz.              |
| 3120  | Dec. 26 | 30 38 00  | 136 33 00 | 62           | 66            | 42.3         | 2,612  | br. oz.              |
| 3121  | Dec. 26 | 30 43 00  | 136 23 00 | 62           | 66            |              | 2,502  | br. oz.              |
| 3122  | Dec. 26 | 30 49 30  | 136 08 30 | 63           | 66            |              | 2,411  | No specimen.         |
| 3123  | Dec. 26 | 30 50 30  | 136 06 30 | 59           | 66            |              | 2,473  | br. oz.              |
| 3124  | Dec. 26 | 30 54 45  | 135 56 35 | 62           | 65            |              | 2,505  | br. oz.              |
| 3125  | Dec. 26 | 30 59 00  | 135 47 00 | 66           | 66            | 35.2         | 2,581  | br. oz.              |
| 3126  | Dec. 26 | 31 04 00  | 135 37 00 | 66           | 66            |              | 2,565  | br. oz.              |
| 3127  | Dec. 26 | 31 08 00  | 135 26 30 | 63           | 66            |              | 2,480  | No specimen.         |
| 3128  | Dec. 26 | 31 12 00  | 135 17 00 | 63           | 65            | 35           | 2,413  | br. oz. lava.        |
| 3129  | Dec. 26 | 31 16 00  | 135 07 00 | 64           | 65            |              | 2,572  | br. oz.              |
| 3130  | Dec. 27 | 31 20 00  | 134 57 00 | 64           | 65            |              | 2,574  | br. oz.              |
| 3131  | Dec. 27 | 31 24 00  | 134 47 00 | 64           | 65            | 35.2         | 2,602  | br. oz.              |
| 3132  | Dec. 27 | 31 28 00  | 134 36 30 | 64           | 65            |              | 2,482  | br. oz. lava.        |
| 3133  | Dec. 27 | 31 32 30  | 134 26 30 | 63           | 65            |              | 2,611  | br. oz.              |
| 3134  | Dec. 27 | 31 37 00  | 134 16 00 | 65           | 65            | 35           | 2,566  | br. oz.              |
| 3135  | Dec. 27 | 31 41 00  | 134 06 00 | 68           | 66            |              | 2,598  | br. oz.              |
| 3136  | Dec. 27 | 31 45 14  | 133 56 00 | 69           | 66            |              | 2,589  | br. oz.              |
| 1892.   |         |           |           |              |               |              |        |                      |
| 3137  | Jan. 10 | 31 49 23  | 133 45 32 | 61           | 63            | 35.1         | 2,550  | br. oz.              |
| 3138  | Jan. 10 | 31 53 30  | 133 36 00 | 61           | 63            |              | 2,516  | br. oz.              |
| 3139  | Jan. 10 | 31 57 30  | 133 26 00 | 61           | 63            |              | 2,619  | br. oz.              |
| 3140  | Jan. 10 | 32 01 30  | 133 16 00 | 60           | 62            | 35.2         | 2,611  | br. oz.              |
| 3141  | Jan. 10 | 32 06 00  | 133 06 00 | 59           | 63            |              | 2,619  | br. oz.              |
| 3142  | Jan. 10 | 32 10 00  | 132 56 00 | 60           | 63            |              | 2,686  | br. oz.              |
| 3143  | Jan. 11 | 32 14 00  | 132 46 00 | 59           | 62            | 35.2         | 2,637  | br. oz.              |
| 3144  | Jan. 11 | 32 18 00  | 132 36 00 | 58           | 62            |              | 2,527  | br. oz.              |
| 3145  | Jan. 11 | 32 22 00  | 132 26 00 | 59           | 62            |              | 2,656  | br. oz.              |
| 3146  | Jan. 11 | 32 26 00  | 132 16 00 | 59           | 62            | 35.1         | 2,341  | br. oz.              |
| 3147  | Jan. 11 | 32 27 00  | 132 14 00 | 59           | 62            |              | 2,223  | br. oz.              |
| 3148  | Jan. 11 | 32 28 00  | 132 12 00 | 59           | 63            |              | 2,560  | br. oz.              |
| 3149  | Jan. 11 | 32 29 30  | 132 06 30 | 59           | 62            | 35.1         | 2,175  | br. oz. lava.        |
| 3150  | Jan. 11 | 32 30 00  | 132 04 30 | 59           | 62            |              | 2,548  | br. oz. bk. sp.      |
| 3151  | Jan. 11 | 32 32 30  | 131 59 30 | 60           | 62            |              | 2,458  | br. oz.              |
| 3152  | Jan. 11 | 32 36 00  | 131 49 30 | 59           | 62            | 35.3         | 2,583  | br. oz.              |
| 3153  | Jan. 11 | 32 39 00  | 131 40 00 | 59           | 62            |              | 2,525  | br. oz.              |
| 3154  | Jan. 11 | 32 43 30  | 131 30 00 | 58           | 62            |              | 2,379  | br. oz.              |
| 3155  | Jan. 11 | 32 47 00  | 131 20 00 | 58           | 61            | 35.3         | 2,519  | br. oz.              |
| 3156  | Jan. 11 | 32 51 00  | 131 10 00 | 58           | 61            |              | 2,535  | br. oz.              |
| 3157  | Jan. 12 | 32 55 00  | 131 00 00 | 58           | 61            |              | 2,572  | br. oz. lava.        |
| 3158  | Jan. 12 | 32 58 30  | 130 50 00 | 58           | 61            | 35.2         | 2,361  | br. oz. lava.        |
| 3159  | Jan. 12 | 32 59 30  | 130 48 00 | 58           | 61            |              | 2,531  | br. oz.              |
| 3160  | Jan. 12 | 33 03 30  | 130 38 00 | 58           | 60            |              | 2,483  | br. oz.              |
| 3161  | Jan. 12 | 33 07 00  | 130 28 00 | 58           | 60            | 35.1         | 2,541  | br. oz.              |
| 3162  | Jan. 12 | 33 10 30  | 130 18 00 | 59           | 62            |              | 2,542  | No specimen.         |
| 3163  | Jan. 12 | 33 14 00  | 130 08 30 | 60           | 62            |              | 2,551  | br. oz.              |
| 3164  | Jan. 12 | 33 18 00  | 129 58 00 | 59           | 61            | 35.1         | 2,584  | br. oz. lava.        |
| 3165  | Jan. 12 | 33 23 00  | 129 45 00 | 58           | 61            | 35.1         | 2,773  | br. oz.              |
| 3166  | Jan. 12 | 33 28 00  | 129 32 00 | 58           | 61            |              | 2,701  | br. oz.              |
| 3167  | Jan. 12 | 33 33 00  | 129 18 30 | 58           | 61            |              | 2,572  | br. oz.              |
| 3168  | Jan. 12 | 33 38 00  | 129 05 30 | 58           | 61            | 35.2         | 2,572  | br. oz.              |
| 3169  | Jan. 13 | 33 43 00  | 128 52 00 | 58           | 60            |              | 2,612  | br. oz.              |
| 3170  | Jan. 13 | 33 48 00  | 128 39 30 | 57           | 61            |              | 2,619  | No specimen.         |
| 3171  | Jan. 13 | 33 53 00  | 128 26 00 | 56           | 59            | 35.1         | 2,637  | br. oz.              |
| 3172  | Jan. 13 | 33 58 00  | 128 13 00 | 56           | 58            |              | 2,568  | br. oz.              |
| 3173  | Jan. 13 | 34 03 00  | 128 00 00 | 58           | 58            |              | 2,632  | br. oz.              |
| 3174  | Jan. 13 | 34 08 10  | 127 46 41 | 60           | 59            | 35.1         | 2,665  | br. oz.              |
| 3175  | Jan. 13 | 34 14 30  | 127 34 30 | 64           | 60            |              | 2,588  | br. oz.              |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.  | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|---|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|   |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Cable survey, Cali-<br>fornia to Hawai-<br>ian Islands. |         |           |           |              |               |              |        |                      |
| 1892.   |         | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 3176  | Jan. 13 | 34 20 30  | 127 22 30 | 58           | 59            | -----        | 2,657  | br. oz.              |
| 3177  | Jan. 13 | 34 26 30  | 127 10 30 | 58           | 58            | 35.1         | 2,680  | br. oz.              |
| 3178  | Jan. 13 | 34 32 30  | 126 58 00 | 57           | 58            | -----        | 2,649  | br. oz.              |
| 3179  | Jan. 13 | 34 38 30  | 126 46 00 | 59           | 58            | -----        | 2,637  | br. oz.              |
| 3180  | Jan. 14 | 34 44 30  | 126 34 00 | 57           | 58            | 35.1         | 2,626  | br. oz.              |
| 3181  | Jan. 14 | 34 50 30  | 126 22 00 | 56           | 57            | -----        | 2,606  | br. oz.              |
| 3182  | Jan. 14 | 34 56 00  | 126 09 30 | 57           | 57            | -----        | 2,586  | br. oz.              |
| 3183  | Jan. 14 | 35 02 00  | 125 57 30 | 57           | 58            | 35.1         | 2,585  | br. and gy. oz.      |
| 3184  | Jan. 14 | 35 08 00  | 125 45 30 | 58           | 57            | -----        | 2,572  | br. oz.              |
| 3185  | Jan. 14 | 35 14 07  | 125 33 18 | 59           | 57            | -----        | 2,560  | br. and gy. oz.      |
| 3186  | Jan. 14 | 35 19 30  | 125 21 30 | 62           | 58            | 35           | 2,529  | gy. and yl. oz.      |
| 3187  | Jan. 14 | 35 25 30  | 125 09 30 | 50           | 57            | 34.9         | 2,496  | br. and gy. oz.      |
| 3188  | Jan. 14 | 35 31 00  | 124 57 30 | 57           | 56            | -----        | 2,445  | br. and gy. oz.      |
| 3189  | Jan. 14 | 35 36 30  | 124 45 30 | 56           | 56            | -----        | 2,413  | br. and gy. oz.      |
| 3190  | Jan. 14 | 35 42 00  | 124 33 30 | 53           | 59            | 34.9         | 2,312  | br. and gy. oz.      |
| 3191  | Jan. 15 | 35 47 30  | 124 21 30 | 54           | 54            | -----        | 2,223  | br. and gy. oz.      |
| 3192  | Jan. 15 | 35 53 00  | 124 09 30 | 54           | 54            | -----        | 2,149  | br. and gy. oz.      |
| 3193  | Jan. 15 | 35 58 30  | 123 57 30 | 54           | 54            | 34.9         | 2,169  | gy. oz.              |
| 3194  | Jan. 15 | 36 04 00  | 123 46 00 | 54           | 55            | -----        | 2,107  | gy. oz.              |
| 3195  | Jan. 15 | 36 09 30  | 123 34 00 | 54           | 54            | -----        | 1,974  | gy. oz.              |
| 3196  | Jan. 15 | 36 15 00  | 123 22 00 | 54           | 52            | 35           | 1,895  | gy. oz.              |
| 3197  | Jan. 15 | 36 21 00  | 123 10 00 | 59           | 52            | -----        | 1,797  | gy. oz.              |
| 3198  | Jan. 15 | 36 25 00  | 123 00 00 | 59           | 52            | -----        | 1,725  | gy. oz.              |
| 3199  | Jan. 15 | 36 29 30  | 122 50 30 | 53           | 52            | 35           | 1,666  | gy. oz.              |
| 3200  | Jan. 15 | 36 34 00  | 122 41 00 | 53           | 52            | -----        | 1,513  | gn. m.               |
| 3201  | Jan. 15 | 36 38 00  | 122 31 00 | 51           | 52            | -----        | 1,417  | gn. m.               |
| 3202  | Jan. 15 | 36 40 00  | 122 26 00 | 52           | 52            | 36.1         | 1,053  | gn. m. fne. s.       |
| Off Alaska.   |         |           |           |              |               |              |        |                      |
| 3203  | Apr. 7  | 58 22 00  | 150 09 00 | 34           | 38            | -----        | 29     | brk. sh.             |
| 3204  | Apr. 7  | 58 25 00  | 150 18 00 | 34           | 38            | -----        | 30     | sh.                  |
| 3205  | Apr. 7  | 58 28 00  | 150 26 00 | 33           | 37            | -----        | 38     | sh.                  |
| 3206  | Apr. 7  | 58 31 00  | 150 34 00 | 33           | 37            | -----        | 47     | crs. s. sh.          |
| 3207  | Apr. 7  | 58 34 00  | 150 42 00 | 33           | 38            | -----        | 49     | bk. s. brk. sh.      |
| 3208  | Apr. 7  | 58 37 00  | 150 50 00 | 33           | 38            | -----        | 85     | gy. s. bk. sp.       |
| 3209  | Apr. 7  | 58 39 00  | 150 58 00 | 33           | 38            | -----        | 103    | m. bk. s.            |
| 3210  | Apr. 8  | 58 40 00  | 151 01 00 | 33           | 38            | -----        | 107    | m. s.                |
| 3211  | Apr. 8  | 58 43 00  | 151 09 00 | 33           | 38            | -----        | 118    | bl. m. bk. sp.       |
| 3212  | Apr. 8  | 58 46 00  | 151 17 00 | 33           | 38            | -----        | 102    | bl. m. bk. sp.       |
| 3213  | Apr. 8  | 58 49 00  | 151 25 00 | 33           | 38            | -----        | 93     | bl. m. bk. sp.       |
| 3214  | Apr. 11 | 59 32 00  | 151 55 00 | 37           | 36            | -----        | 20     | gy. s.               |
| 3215  | Apr. 18 | 59 56 00  | 145 56 00 | 40           | 41            | -----        | 55     | s. m.                |
| 3215a   | Apr. 18 | 59 34 45  | 144 58 00 | 43           | 42            | -----        | 81     | gn. m.               |
| 3216  | Apr. 18 | 59 33 00  | 144 52 00 | 43           | 43            | -----        | 97     | p. m.                |
| 3217  | Apr. 18 | 59 31 00  | 144 43 00 | 43           | 43            | -----        | 377    | g. m.                |
| 3218  | Apr. 18 | 59 35 00  | 143 21 00 | 38           | 40            | -----        | 156    | p.                   |
| 3219  | Apr. 19 | 59 35 00  | 143 18 00 | 38           | 41            | -----        | 140    | m. p.                |
| 3220  | Apr. 19 | 59 36 00  | 142 57 00 | 38           | 41            | -----        | 225    | bl. m.               |
| 3221  | Apr. 19 | 59 37 00  | 142 45 00 | 39           | 41            | -----        | 281    | bl. m. g.            |
| 3222  | Apr. 19 | 59 19 00  | 142 10 00 | 40           | 42            | 37.4         | 504    | gn. m.               |
| 3223  | Apr. 19 | 59 21 00  | 141 50 00 | 40           | 42            | -----        | 114    | p.                   |
| 3224  | Apr. 19 | 59 14 00  | 141 35 00 | 41           | 42            | -----        | 116    | s. g.                |
| 3225  | Apr. 19 | 58 56 00  | 140 56 00 | 41           | 42            | 37.9         | 471    | gn. m.               |
| Off Brit. Columbia.                                     |         |           |           |              |               |              |        |                      |
| 3226  | Apr. 24 | 50 25 00  | 129 15 00 | 46           | 46            | 35.3         | 1,141  | gn. m.               |
| 3227  | Apr. 25 | 49 42 00  | 127 53 00 | 49           | 48            | 37.5         | 848    | gn. m.               |
| 3228  | Apr. 26 | 48 35 00  | 126 42 00 | 48           | 48            | 37           | 746    | gn. m.               |
| 3229  | Apr. 27 | 48 29 30  | 124 56 30 | 52           | 51            | -----        | 51     | p. rky.              |
| 3230  | Apr. 27 | 48 29 00  | 124 55 00 | 52           | 51            | -----        | 53     | p. rky.              |
| Western Bering Sea.                                     |         |           |           |              |               |              |        |                      |
|   |         |           | Long. E.  |              |               |              |        |                      |
| 3231  | May 29  | 53 13 00  | 172 38 00 | 41           | 40            | -----        | 1,447  | yl. m. fne. s.       |
| 3232  | May 30  | 53 38 00  | 171 28 00 | 38           | 39            | -----        | 1,818  | No specimen.         |
| 3233  | May 30  | 54 02 00  | 170 17 00 | 42           | 40            | -----        | 1,853  | fne. bk. s.          |
| 3234  | May 30  | 54 19 00  | 169 03 00 | 40           | 40            | 35.6         | 1,996  | yl. m. s.            |
| 3235  | May 31  | 54 30 00  | 168 07 00 | 40           | 40            | -----        | 47     | fne. gy. s.          |
| 3236  | May 31  | 55 09 00  | 165 51 00 | 40           | 40            | -----        | 25     | rky.                 |
| 3237  | May 31  | 55 10 00  | 165 47 00 | 39           | 40            | -----        | 33     | rky. m.              |
| 3238  | May 31  | 55 08 00  | 165 48 00 | 39           | 39            | -----        | 36     | gy. s.               |
| 3239  | May 31  | 55 10 30  | 165 45 00 | 39           | 39            | -----        | 32     | gy. s.               |
| Western coast of<br>United States.                      |         |           |           |              |               |              |        |                      |
|   | 1893.   |           | Long. W.  |              |               |              |        |                      |
| 3240  | Apr. 26 | 36 48 15  | 121 59 05 | 58           | 54            | -----        | 266    | None obtained.       |
| 3241  | Apr. 27 | 37 29 00  | 123 01 20 | 54           | 53            | -----        | 301    | stf. gy. m.          |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.  | Date.   | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|-------------|---------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|             |         | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Off Alaska. |         |           |           |              |               |              |        |                      |
|             | 1893.   | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 3242        | June 5  | 57 40 00  | 143 18 00 | 48           | 47            | 35           | 2,064  | gy. oz.              |
| 3243        | June 6  | 57 44 00  | 150 45 00 | 46           | 45            | -----        | 59     | gy. s. sh.           |
| 3244        | June 8  | 56 48 00  | 152 30 00 | 47           | 45            | -----        | 87     | stf. m.              |
| 3245        | June 15 | 54 42 00  | 160 47 00 | 47           | 44            | -----        | 60     | bl. m.               |
| 3246        | June 17 | 54 56 15  | 159 01 00 | 46           | 43            | -----        | 48     | gy. s. p.            |
| 3247        | June 17 | 54 56 30  | 159 05 20 | 46           | 43            | -----        | 41     | gy. s. rky.          |
| 3248        | June 17 | 54 56 45  | 159 09 00 | 46           | 43            | -----        | 36     | gy. s.               |
| 3249        | June 17 | 54 57 45  | 159 11 00 | 45           | 43            | -----        | 38     | gy. s.               |
| 3250        | June 17 | 54 58 45  | 159 13 45 | 46           | 43            | -----        | 33     | s. brk. sh.          |
| 3251        | June 17 | 55 01 30  | 159 16 30 | 46           | 43            | -----        | 27     | gy. s.               |
| 3252        | June 17 | 55 02 15  | 159 19 00 | 46           | 43            | -----        | 17     | fne. gy. s.          |
| 3253        | June 27 | 54 04 00  | 162 55 00 | 48           | 46            | -----        | 48     | s. g.                |
| 3254        | July 1  | 51 32 00  | 175 52 00 | 43           | 48            | 36.6         | 697    | bk. s.               |
| 3255        | July 1  | 51 35 40  | 176 41 00 | 47           | 48            | -----        | 62     | crs. gy. s. sh.      |
| 3256        | July 1  | 51 35 40  | 176 46 15 | 48           | 48            | -----        | 46     | crs. gy. s.          |
| 3257        | July 5  | 51 33 30  | 176 50 00 | 50           | 47            | -----        | 57     | sh.                  |
| 3258        | July 5  | 51 32 00  | 176 49 00 | 50           | 47            | -----        | 78     | gy. s. sh.           |
| 3259        | July 5  | 51 28 00  | 176 49 00 | 50           | 47            | 39.4         | 172    | gy. s. p.            |
| 3260        | July 5  | 51 24 00  | 176 50 00 | 52           | 44            | 38.6         | 428    | gy. s. sh.           |
| 3261        | July 6  | 51 19 00  | 176 39 00 | 48           | 44            | 38.5         | 1,622  | bk. s. brk. sh.      |
| 3262        | July 6  | 51 11 00  | 176 25 00 | 52           | 44            | 36.9         | 2,350  | gy. oz. fne. s.      |
| 3263        | July 6  | 51 00 00  | 176 04 00 | 52           | 44            | 37.3         | 2,039  | gy. m. s.            |
| 3264        | July 6  | 50 41 00  | 175 30 00 | 49           | 48            | 39.6         | 3,323  | gy. m. s.            |
| 3265        | July 6  | 50 28 00  | 175 10 00 | 50           | 49            | 34.6         | 4,002  | br. oz.              |
| 3266        | July 7  | 50 16 00  | 174 51 00 | 50           | 48            | -----        | 3,191  | None obtained.       |
| 3267        | July 7  | 50 03 00  | 174 30 00 | 50           | 49            | 35           | 2,802  | gy. oz.              |
| 3268        | July 7  | 50 31 00  | 173 54 00 | 53           | 49            | -----        | 3,667  | hard.                |
| 3269        | July 7  | 50 57 00  | 173 06 00 | 49           | 48            | -----        | 3,794  | br. oz. s.           |
| 3270        | July 8  | 51 23 00  | 172 18 00 | 50           | 49            | -----        | 2,320  | br. oz. s.           |
| 3271        | July 8  | 51 50 00  | 171 38 00 | 49           | 48            | -----        | 1,330  | fne. bk. s.          |
| 3272        | July 8  | 52 24 00  | 171 40 00 | 48           | 44            | -----        | 250    | rky.                 |
| 3273        | July 8  | 52 31 00  | 171 42 00 | 47           | 41            | -----        | 320    | fne. g.              |
| 3274        | July 8  | 52 44 00  | 171 35 00 | 46           | 41            | -----        | 97     | dk. s. p.            |
| 3275        | July 8  | 52 54 00  | 171 29 00 | 45           | 40            | -----        | 369    | fne. bk. s. g.       |
| 3276        | July 9  | 55 04 00  | 170 11 00 | 49           | 46            | -----        | 1,554  | gn. m. s.            |
| 3277        | July 9  | 55 36 00  | 170 02 00 | 48           | 47            | -----        | 1,626  | gn. m.               |
| 3278        | July 9  | 56 06 00  | 169 58 00 | 48           | 47            | -----        | 68     | gy. s. sh.           |
| 3279        | July 9  | 56 16 00  | 169 57 00 | 48           | 47            | -----        | 72     | gy. s. bk. sp.       |
| 3280        | July 9  | 56 35 00  | 169 55 00 | 48           | 47            | -----        | 52     | s. rky.              |
| 3281        | July 12 | 57 18 00  | 169 38 00 | 42           | 42            | -----        | 35     | gy. s. sh.           |
| 3282        | July 12 | 57 18 00  | 172 20 00 | 43           | 44            | 38           | 62     | gn. m.               |
| 3283        | July 12 | 57 18 00  | 172 27 00 | 43           | 44            | 36.6         | 62     | gn. m. s.            |
| 3284        | July 12 | 57 18 00  | 172 43 00 | 42           | 44            | 38           | 62     | co.                  |
| 3285        | July 12 | 57 18 00  | 172 51 00 | 43           | 44            | 37           | 64     | gn. m.               |
| 3286        | July 12 | 57 18 00  | 173 00 00 | 43           | 44            | 37           | 65     | gn. m.               |
| 3287        | July 13 | 57 18 00  | 173 09 00 | 42           | 44            | 37           | 66     | gn. m.               |
| 3288        | July 13 | 57 18 00  | 173 18 00 | 42           | 44            | 37           | 67     | rky.                 |
| 3289        | July 13 | 57 19 00  | 173 27 00 | 42           | 43            | 37.8         | 69     | rky.                 |
| 3290        | July 13 | 57 19 00  | 173 36 00 | 42           | 43            | 38           | 71     | gn. m.               |
| 3291        | July 13 | 57 19 00  | 173 45 00 | 42           | 42            | 37.8         | 82     | rky.                 |
| 3292        | July 13 | 57 15 00  | 173 46 00 | 43           | 43            | 37.9         | 78     | gn. m. fne. s.       |
| 3293        | July 13 | 57 11 00  | 173 42 00 | 43           | 43            | 37.7         | 77     | gy. s.               |
| 3294        | July 13 | 57 06 00  | 173 42 00 | 43           | 43            | 38           | 81     | gy. s.               |
| 3295        | July 13 | 56 51 00  | 173 37 00 | 47           | 45            | 37           | 516    | gn. m. s.            |
| 3296        | July 13 | 56 42 00  | 173 18 00 | 46           | 46            | 37.7         | 80     | fne. gy. s. rky.     |
| 3297        | July 13 | 56 37 00  | 173 21 00 | 46           | 46            | 37.7         | 80     | fne. gy. s. bk. sp.  |
| 3298        | July 13 | 56 32 00  | 173 24 00 | 46           | 46            | 36.2         | 797    | yl. m. g.            |
| 3299        | July 13 | 56 29 00  | 173 19 00 | 47           | 46            | 35.5         | 1,188  | None obtained.       |
| 3300        | July 13 | 56 30 00  | 172 56 00 | 46           | 45            | 38           | 74     | gy. s.               |
| 3301        | July 14 | 56 30 00  | 172 25 00 | 46           | 44            | 38           | 100    | fne. gy. s. bk. sp.  |
| 3302        | July 17 | 56 07 00  | 169 33 00 | 49           | 46            | 38.3         | 260    | fne. gy. s.          |
| 3303        | July 17 | 55 24 00  | 168 34 00 | 48           | 45            | -----        | 843    | fne. gy. s.          |
| 3304        | July 18 | 55 09 00  | 168 11 00 | 51           | 45            | -----        | 809    | fne. gy. s.          |
| 3305        | July 18 | 54 56 00  | 167 44 00 | 50           | 46            | -----        | 756    | gn. m. vol. s.       |
| 3306        | July 18 | 54 42 00  | 167 39 00 | 50           | 48            | -----        | 442    | gn. m.               |
| 3307        | July 28 | 57 03 00  | 169 54 00 | 50           | 44            | 41.9         | 35     | fne. gy. s.          |
| 3308        | July 28 | 57 03 00  | 168 52 00 | 50           | 45            | 37.6         | 43     | gy. s. sh.           |
| 3309        | July 28 | 57 15 00  | 167 42 00 | 45           | 43            | 36           | 41     | fne. gy. s.          |
| 3310        | July 29 | 57 21 00  | 167 05 00 | 45           | 42            | 35           | 33     | fne. bk. s.          |
| 3311        | July 29 | 57 27 00  | 166 30 00 | 45           | 42            | 34.8         | 38     | fne. s. bk. m.       |
| 3312        | July 29 | 57 38 00  | 165 20 00 | 45           | 42            | 35.5         | 35     | fne. s. dk. m.       |
| 3313        | July 29 | 58 13 00  | 164 47 00 | 44           | 42            | 41.4         | 26     | fne. gy. s.          |
| 3314        | July 29 | 58 42 00  | 165 30 00 | 43           | 41            | 41.8         | 22     | gy. s.               |
| 3315        | July 30 | 58 51 00  | 166 11 00 | 42           | 41            | 41.0         | 21     | fne. gy. s.          |
| 3316        | July 30 | 58 36 00  | 166 38 00 | 42           | 41            | 40.1         | 25     | fne. gy. s.          |
| 3317        | July 30 | 58 22 00  | 167 04 00 | 44           | 42            | 37.0         | 29     | crs. gy. s.          |
| 3318        | July 30 | 58 07 00  | 167 29 00 | 45           | 42            | 35.5         | 36     | gn. m. fne. s.       |
| 3319        | July 30 | 57 52 00  | 167 54 00 | 46           | 43            | 37.5         | 38     | dk. m. fne. s.       |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.   |           | Temperature. |               |              | Depth. | Character of bottom.   |
|------------|---------|-------------|-----------|--------------|---------------|--------------|--------|------------------------|
|            |         | Lat. N.     | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                        |
|            |         | Off Alaska. |           |              |               |              |        |                        |
|            | 1893.   | ° ' "       | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                        |
| 3320       | July 30 | 57 38 00    | 168 19 00 | 46           | 43            | 36.1         | 36     | fne. gy. s.            |
| 3321       | July 31 | 57 24 00    | 168 42 00 | 46           | 44            | 36.8         | 41     | gy. s. rky.            |
| 3322       | July 31 | 57 10 00    | 169 05 00 | 46           | 44            | 37.3         | 42     | fne. gy. s. bk. sp.    |
| 3323       | Aug. 1  | 58 08 30    | 169 14 00 | 47           | 45            | 31.8         | 38     | dk. m. fne. s.         |
| 3324       | Aug. 1  | 58 45 30    | 168 48 00 | 44           | 43            | 33.9         | 30     | fne. gy. s. m.         |
| 3325       | Aug. 2  | 59 04 00    | 168 34 00 | 43           | 42            | 39.8         | 24     | fne. gy. s. bk. sp.    |
| 3326       | Aug. 2  | 59 41 00    | 168 06 00 | 42           | 41            | 41.1         | 22     | fne. gy. s. sh.        |
| 3327       | Aug. 2  | 59 55 00    | 167 55 00 | 42           | 42            | -----        | 14     | gy. s.                 |
| 3328       | Aug. 2  | 59 58 00    | 167 54 00 | 42           | 42            | -----        | 16     | gy. s. sh.             |
| 3329       | Aug. 2  | 59 58 00    | 167 53 00 | 42           | 42            | -----        | 14     | fne. gy. s.            |
| 3330       | Aug. 2  | 60 00 00    | 167 53 00 | 42           | 42            | -----        | 14     | fne. gy. s.            |
| 3331       | Aug. 2  | 60 01 30    | 167 54 00 | 42           | 42            | -----        | 14     | fne. gy. s.            |
| 3332       | Aug. 2  | 60 03 00    | 167 55 00 | 42           | 42            | -----        | 14     | fne. gy. s.            |
| 3333       | Aug. 2  | 60 05 00    | 167 56 00 | 42           | 42            | -----        | 15     | fne. gy. s.            |
| 3334       | Aug. 2  | 60 06 30    | 167 57 00 | 42           | 42            | -----        | 16     | fne. gy. s.            |
| 3335       | Aug. 2  | 60 08 00    | 167 58 00 | 42           | 42            | -----        | 15     | fne. gy. s.            |
| 3336       | Aug. 2  | 60 09 30    | 167 59 00 | 42           | 42            | -----        | 15     | fne. gy. s. bk. sh.    |
| 3337       | Aug. 2  | 60 11 00    | 168 00 00 | 42           | 42            | -----        | 16     | fne. gy. s.            |
| 3338       | Aug. 2  | 60 13 00    | 168 01 00 | 42           | 42            | -----        | 16     | fne. gy. s. bk. sh.    |
| 3339       | Aug. 2  | 60 14 30    | 168 02 00 | 42           | 42            | -----        | 16     | fne. gy. s.            |
| 3340       | Aug. 2  | 60 16 00    | 168 03 00 | 42           | 43            | -----        | 16     | fne. gy. s.            |
| 3341       | Aug. 2  | 60 17 30    | 168 04 00 | 43           | 43            | -----        | 16     | fne. gy. s.            |
| 3342       | Aug. 2  | 60 19 00    | 168 05 00 | 43           | 43            | -----        | 16     | fne. gy. s.            |
| 3343       | Aug. 2  | 60 21 00    | 168 05 00 | 43           | 43            | -----        | 17     | fne. gy. s. bk. sh.    |
| 3344       | Aug. 2  | 60 22 00    | 168 06 00 | 43           | 43            | -----        | 16     | fne. gy. s.            |
| 3345       | Aug. 2  | 60 24 00    | 168 07 00 | 43           | 43            | -----        | 19     | fne. gy. s. bk. sh.    |
| 3346       | Aug. 2  | 60 26 00    | 168 08 00 | 43           | 43            | -----        | 19     | fne. gy. s.            |
| 3347       | Aug. 2  | 60 26 00    | 169 54 00 | 41           | 41            | 35.3         | 27     | gn. m. fne. s.         |
| 3348       | Aug. 3  | 60 24 00    | 170 48 00 | 42           | 42            | 32.0         | 35     | bk. m.                 |
| 3349       | Aug. 3  | 59 47 00    | 171 08 00 | 43           | 43            | 31.8         | 38     | dk. m.                 |
| 3350       | Aug. 3  | 58 52 00    | 170 38 00 | 45           | 44            | 30.8         | 40     | bk. m.                 |
| 3351       | Aug. 4  | 58 33 00    | 170 28 00 | 46           | 43            | -----        | 42     | None obtained.         |
| 3352       | Aug. 4  | 58 15 00    | 170 18 00 | 46           | 44            | 35.4         | 40     | gn. m. fne. s.         |
| 3353       | Aug. 5  | 57 24 00    | 170 24 00 | 47           | 43            | 40.3         | 37     | fne. gy. s. sh.        |
| 3354       | Aug. 5  | 58 04 00    | 171 41 00 | 48           | 45            | 37.4         | 55     | gn. m.                 |
| 3355       | Aug. 5  | 58 52 00    | 172 45 00 | 48           | 44            | 35.3         | 57     | gn. m.                 |
| 3356       | Aug. 6  | 59 09 00    | 173 09 00 | 45           | 43            | 34.2         | 57     | gn. m.                 |
| 3357       | Aug. 6  | 59 24 00    | 173 31 00 | 45           | 43            | 35.7         | 57     | gn. m.                 |
| 3358       | Aug. 6  | 59 33 00    | 175 00 00 | 51           | 46            | 36.7         | 70     | gn. m.                 |
| 3359       | Aug. 7  | 58 43 00    | 176 10 00 | 44           | 44            | -----        | 71     | gn. m.                 |
| 3360       | Aug. 7  | 58 11 00    | 176 38 00 | 45           | 44            | 35.5         | 1,744  | gn. m. fne. s.         |
| 3361       | Aug. 7  | 58 01 00    | 175 41 00 | 48           | 46            | 35.2         | 1,367  | gn. m. fne. s.         |
| 3362       | Aug. 7  | 57 41 00    | 174 05 00 | 49           | 47            | 38.0         | 77     | gn. m.                 |
| 3363       | Aug. 7  | 57 25 00    | 172 50 00 | 47           | 45            | 37.8         | 69     | dk. gn. m. fne. s.     |
| 3364       | Aug. 8  | 57 08 00    | 171 38 00 | 47           | 45            | 37.8         | 60     | gn. m.                 |
| 3365       | Aug. 9  | 56 49 00    | 169 42 00 | 46           | 44            | 40.9         | 37     | fne. s. sh.            |
| 3366       | Aug. 9  | 56 37 00    | 167 55 00 | 49           | 46            | 38.0         | 59     | gn. m. s.              |
| 3367       | Aug. 9  | 56 31 00    | 166 43 00 | 48           | 46            | 37.5         | 55     | dk. gn. m. fne. s.     |
| 3368       | Aug. 10 | 56 23 00    | 165 28 00 | 48           | 45            | 36.5         | 48     | gn. m. fne. s.         |
| 3369       | Aug. 10 | 56 18 00    | 164 48 00 | 48           | 45            | 36.4         | 49     | fne. gy. s.            |
| 3370       | Aug. 10 | 54 53 15    | 164 25 40 | 53           | 47            | -----        | 20     | dk. gy. s. lava.       |
| 3371       | Aug. 10 | 54 52 00    | 164 26 20 | 53           | 47            | -----        | 17     | dk. gy. s. lava.       |
| 3372       | Aug. 10 | 54 51 30    | 164 26 40 | 53           | 47            | -----        | 15     | dk. gy. s.             |
| 3373       | Aug. 10 | 54 51 00    | 164 27 00 | 53           | 47            | -----        | 14     | dk. gy. s.             |
| 3374       | Aug. 10 | 54 50 30    | 164 27 20 | 53           | 47            | -----        | 9      | dk. gy. s.             |
| 3375       | Aug. 17 | 53 25 00    | 167 33 00 | 47           | 46            | 41.8         | 43     | bk. s.                 |
| 3376       | Aug. 17 | 53 35 00    | 167 53 00 | 47           | 44            | 40.3         | 89     | g.                     |
| 3377       | Aug. 17 | 53 38 00    | 167 59 00 | 48           | 44            | 37.9         | 407    | fne. gy. s. bk. sp.    |
| 3378       | Aug. 17 | 53 45 00    | 168 01 30 | 48           | 44            | 36.2         | 755    | gn. m. fne. s.         |
| 3379       | Aug. 17 | 53 52 00    | 168 01 30 | 48           | 47            | 36.5         | 717    | dk. s. fne. g.         |
| 3380       | Aug. 17 | 53 56 00    | 168 07 00 | 48           | 47            | 36.6         | 781    | bk. vol. s.            |
| 3381       | Aug. 17 | 54 04 00    | 168 14 00 | 49           | 48            | 35.8         | 1,263  | gy. s.                 |
| 3382       | Aug. 17 | 54 30 00    | 168 35 00 | 49           | 47            | 36.4         | 822    | hard.                  |
| 3383       | Aug. 17 | 54 56 00    | 168 56 00 | 48           | 46            | 35.9         | 1,205  | gy. s.                 |
| 3384       | Aug. 18 | 55 22 00    | 169 17 00 | 48           | 47            | 35.9         | 1,187  | gn. m. s.              |
| 3385       | Aug. 18 | 55 50 00    | 169 24 00 | 46           | 47            | 36.0         | 1,036  | gn. m. s.              |
| 3386       | Aug. 18 | 55 59 00    | 169 27 00 | 49           | 47            | 38.3         | 341    | gn. m. crs. bk. s.     |
| 3387       | Aug. 18 | 56 09 00    | 169 29 00 | 49           | 48            | 38.7         | 292    | dk. m.                 |
| 3388       | Aug. 18 | 56 19 00    | 169 32 00 | 49           | 48            | -----        | 74     | gy. s. g.              |
| 3389       | Aug. 18 | 56 47 00    | 170 34 00 | 46           | 43            | -----        | 57     | dk. m.                 |
| 3390       | Aug. 19 | 56 45 00    | 171 10 00 | 46           | 45            | -----        | 63     | fne. gy. s. bk. sp.    |
| 3391       | Aug. 19 | 56 42 00    | 171 45 00 | 46           | 45            | -----        | 65     | fne. gy. s. bk. sp.    |
| 3392       | Aug. 19 | 56 39 00    | 172 21 00 | 47           | 45            | 38.9         | 76     | gy. s. m.              |
| 3393       | Aug. 19 | 56 36 00    | 172 56 00 | 46           | 46            | 38.1         | 346    | gn. m.                 |
| 3394       | Aug. 19 | 56 32 00    | 173 32 00 | 47           | 46            | 35.4         | 1,631  | bl. m. fne. s. g.      |
| 3395       | Aug. 19 | 56 29 00    | 174 26 00 | 48           | 47            | 35.4         | 1,787  | crs. bk. s.            |
| 3396       | Aug. 19 | 56 25 00    | 175 36 00 | 47           | 47            | 35.4         | 2,000  | gn. m. fne. s. bk. sp. |
| 3397       | Aug. 20 | 56 21 00    | 176 45 00 | 48           | 47            | 35.0         | 2,049  | gn. m.                 |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No.  | Date.    | Position. |           | Temperature. |               |              | Depth. | Character of bottom. |
|-------------|----------|-----------|-----------|--------------|---------------|--------------|--------|----------------------|
|             |          | Lat. N.   | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
| Off Alaska. |          |           |           |              |               |              |        |                      |
|             | 1898.    | ° ' "     | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 3398        | Aug. 20  | 55 35 00  | 176 13 00 | 48           | 47            | 35.1         | 2,055  | gn. m. fine. s.      |
| 3399        | Aug. 20  | 54 38 00  | 175 27 00 | 56           | 49            | 35.1         | 2,041  | gn. m. s.            |
| 3400        | Aug. 20  | 55 00 00  | 174 32 00 | 48           | 47            | 35.3         | 1,990  | gn. m. fine. s.      |
| 3401        | Aug. 21  | 55 23 00  | 173 38 00 | 48           | 47            | 35.5         | 1,928  | gn. m. fine. s.      |
| 3402        | Aug. 21  | 55 46 00  | 172 44 00 | 51           | 48            | 35.1         | 1,833  | gn. m. fine. s.      |
| 3403        | Aug. 21  | 56 26 00  | 171 04 00 | 50           | 46            | -----        | 171    | gn. m. fine. s.      |
| 3404        | Aug. 22  | 56 18 00  | 170 34 00 | 49           | 46            | 39.0         | 69     | gn. m. fine. s.      |
| 3405        | Aug. 22  | 56 01 00  | 170 50 00 | 48           | 47            | 36.0         | 924    | gn. m. crs. s.       |
| 3406        | Aug. 22  | 55 43 00  | 171 07 00 | 49           | 48            | 35.4         | 1,647  | gn. m. fine. s.      |
| 3407        | Aug. 22  | 54 59 00  | 171 49 00 | 49           | 48            | 35.1         | 1,867  | gn. m.               |
| 3408        | Aug. 22  | 54 17 00  | 172 30 00 | 48           | 47            | 35.0         | 1,932  | gn. m. fine. s.      |
| 3409        | Aug. 23  | 53 48 00  | 173 11 00 | 50           | 48            | 35.1         | 1,948  | br. m. dk. s.        |
| 3410        | Aug. 23  | 53 29 00  | 171 51 00 | 50           | 48            | 35.2         | 1,429  | gn. m. bk. s.        |
| 3411        | Aug. 23  | 53 09 00  | 170 31 00 | 50           | 48            | 35.8         | 1,027  | bk. s.               |
| 3412        | Aug. 24  | 53 38 00  | 170 39 00 | 48           | 47            | -----        | 1,171  | bk. s. c.            |
| 3413        | Aug. 24  | 54 08 00  | 170 47 00 | 49           | 48            | -----        | 1,053  | gn. m. fine. s.      |
| 3414        | Aug. 31  | 54 13 00  | 165 58 00 | 51           | 46            | 44.6         | 42     | dk. gy. s.           |
| 3415        | Aug. 31  | 54 10 00  | 165 54 00 | 51           | 46            | 45.0         | 42     | dk. gy. s.           |
| 3416        | Aug. 31  | 54 07 00  | 165 51 00 | 54           | 47            | 45.0         | 38     | bk. m. fine. s.      |
| 3417        | Aug. 31  | 54 18 00  | 165 41 00 | 51           | 46            | 45.9         | 45     | g. brk. sh.          |
| 3418        | Aug. 31  | 54 26 00  | 165 28 00 | 50           | 46            | 41.5         | 84     | g. crs. bk. s.       |
| 3419        | Aug. 31  | 54 14 00  | 165 33 00 | 55           | 47            | -----        | 23     | fine. gy. s.         |
| 3420        | Aug. 31  | 54 13 45  | 165 33 30 | 55           | 47            | -----        | 23     | fine. gy. s.         |
| 3421        | Aug. 31  | 54 13 30  | 165 34 00 | 55           | 47            | -----        | 28     | fine. gy. s.         |
| 3422        | Aug. 31  | 54 13 15  | 165 34 30 | 55           | 47            | -----        | 25     | fine. gy. s. bk. sp. |
| 3423        | Aug. 31  | 54 13 00  | 165 35 00 | 55           | 47            | -----        | 26     | fine. gy. s. sh.     |
| 3424        | Sept. 1  | 54 36 00  | 165 27 00 | 50           | 46            | 39.0         | 113    | bk. s. g.            |
| 3425        | Sept. 1  | 55 12 00  | 166 36 00 | 53           | 49            | 39.9         | 81     | g. m.                |
| 3426        | Sept. 1  | 55 47 00  | 167 53 00 | 49           | 47            | 38.8         | 78     | fine. bk. s.         |
| 3427        | Sept. 1  | 55 59 00  | 168 19 00 | 49           | 46            | 39.0         | 70     | fine. gy. s.         |
| 3428        | Sept. 2  | 56 11 00  | 168 45 00 | 48           | 46            | 39.0         | 97     | fine. dk. s.         |
| 3429        | Sept. 2  | 56 22 00  | 169 09 00 | 49           | 47            | 40.0         | 77     | crs. s. g.           |
| 3430a       | Sept. 2  | 56 28 00  | 170 04 00 | 49           | 47            | 39.3         | 61     | gn. m. fine. s.      |
| 3430        | Sept. 2  | 56 55 00  | 170 18 00 | 49           | 46            | 40.6         | 47     | gn. m. fine. s.      |
| 3431        | Sept. 3  | 56 48 00  | 169 26 00 | 47           | 45            | 39.0         | 43     | gn. m.               |
| 3432        | Sept. 8  | 54 01 30  | 166 23 00 | 51           | 47            | 44.7         | 42     | bk. s. g.            |
| 3433        | Sept. 8  | 54 05 00  | 166 18 00 | 52           | 47            | 43.2         | 49     | rky.                 |
| 3434        | Sept. 8  | 54 09 00  | 166 15 00 | 52           | 45            | 42.5         | 54     | g. brk. sh.          |
| 3435        | Sept. 8  | 54 12 00  | 166 09 00 | 51           | 45            | 42.1         | 57     | dk. g.               |
| 3436        | Sept. 8  | 54 16 40  | 165 50 00 | 51           | 45            | 44.0         | 49     | dk. gy. s.           |
| 3437        | Sept. 8  | 54 18 00  | 165 40 00 | 57           | 46            | 43.0         | 50     | gy. s. brk. sh.      |
| 3438        | Sept. 8  | 54 15 30  | 165 32 00 | 57           | 46            | 42.9         | 51     | crs. dk. s. brk. sh. |
| 3439        | Sept. 9  | 54 27 00  | 163 55 00 | 52           | 48            | 46.5         | 52     | fine. gy. s. bk. sp. |
| 3440        | Sept. 9  | 54 32 00  | 163 31 00 | 55           | 48            | 44.0         | 54     | bk. s. g.            |
| 3441        | Sept. 9  | 54 33 00  | 163 19 00 | 55           | 48            | 42.8         | 61     | bk. g.               |
| 3442        | Sept. 9  | 54 39 00  | 163 05 00 | 53           | 47            | 45.6         | 35     | fine. g. brk. sh.    |
| 3443        | Sept. 9  | 54 40 00  | 163 03 00 | 53           | 47            | -----        | 37     | g. brk. sh.          |
| 3444        | Sept. 9  | 54 44 00  | 162 56 00 | 53           | 47            | -----        | 41     | rky.                 |
| 3445        | Sept. 9  | 54 46 00  | 162 52 00 | 51           | 48            | -----        | 30     | crs. dk. s.          |
| 3446        | Sept. 9  | 54 48 00  | 162 50 00 | 51           | 48            | -----        | 33     | bk. s.               |
| 3447        | Sept. 9  | 54 51 00  | 162 43 00 | 51           | 49            | -----        | 23     | rky.                 |
| 3448        | Sept. 9  | 54 52 00  | 162 41 00 | 51           | 49            | -----        | 15     | brk. sh.             |
| 3449        | Sept. 9  | 54 53 00  | 162 39 00 | 51           | 49            | -----        | 18     | g. brk. sh.          |
| 3450        | Sept. 9  | 54 53 30  | 162 38 00 | 51           | 49            | -----        | 15     | g. brk. sh.          |
| 3451        | Sept. 9  | 54 54 00  | 162 37 00 | 51           | 49            | -----        | 10     | bk. s. brk. sh.      |
| 3452        | Sept. 11 | 55 12 30  | 161 53 00 | 52           | 48            | -----        | 22     | bk. s. r.            |
| 3453        | Sept. 11 | 55 18 00  | 161 18 00 | 53           | 49            | -----        | 32     | dk. s.               |
| 3454        | Sept. 11 | 55 19 00  | 161 03 00 | 52           | 49            | -----        | 28     | crs. s. g. brk. sh.  |
| 3455        | Sept. 11 | 55 23 30  | 160 54 00 | 52           | 49            | -----        | 31     | gy. s. bk. sp.       |
| 3456        | Sept. 11 | 55 24 30  | 160 49 30 | 52           | 49            | -----        | 32     | bk. s.               |
| 3457        | Sept. 11 | 55 25 00  | 160 45 00 | 53           | 49            | -----        | 42     | fine. bk. s.         |
| 3458        | Sept. 11 | 55 26 00  | 160 41 00 | 53           | 49            | -----        | 36     | brk. sh.             |
| 3459        | Sept. 11 | 55 28 00  | 160 37 00 | 53           | 49            | -----        | 21     | brk. sh.             |
| 3460        | Sept. 11 | 55 29 00  | 160 35 00 | 52           | 48            | -----        | 19     | g. brk. sh.          |
| 3461        | Sept. 11 | 55 30 00  | 160 34 30 | 52           | 48            | -----        | 13     | bk. s. sh.           |
| 3462        | Sept. 11 | 55 31 00  | 160 35 00 | 52           | 48            | -----        | 27     | fine. bk. s. sh.     |
| 3463        | Sept. 11 | 55 32 00  | 160 35 00 | 52           | 48            | -----        | 31     | fine. bk. s.         |
| 3464        | Sept. 11 | 55 33 00  | 160 35 00 | 52           | 48            | -----        | 38     | bk. s.               |
| 3465        | Sept. 11 | 55 34 00  | 160 35 00 | 52           | 48            | -----        | 38     | gy. s. sh.           |
| 3466        | Sept. 11 | 55 35 00  | 160 35 00 | 52           | 49            | -----        | 42     | bk. s.               |
| 3467        | Sept. 11 | 55 35 30  | 160 35 00 | 52           | 49            | -----        | 31     | bk. s. sh.           |
| 3468        | Sept. 11 | 55 36 00  | 160 35 00 | 52           | 49            | -----        | 26     | bk. s.               |
| 3469        | Sept. 14 | 57 14 00  | 151 52 00 | 48           | 47            | -----        | 46     | gy. s. brk. sh.      |
| 3470        | Sept. 14 | 57 24 00  | 149 33 00 | 48           | 47            | 36.1         | 938    | rky.                 |
| 3471        | Sept. 14 | 57 21 00  | 149 11 00 | 49           | 47            | 35.1         | 1,427  | bl. m. s.            |
| 3472        | Sept. 14 | 57 18 00  | 148 38 00 | 50           | 48            | 35.1         | 1,961  | br. m. fine. s.      |
| 3473        | Sept. 15 | 57 14 00  | 148 06 00 | 50           | 47            | 35           | 2,741  | br. m.               |
| 3474        | Sept. 15 | 57 06 00  | 147 22 00 | 53           | 51            | 35           | 2,587  | br. m.               |



*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.                                       | Date.    | Position. |           | Temperature. |          |         | Depth. | Character of bottom.  |
|--|----------|-----------|-----------|--------------|----------|---------|--------|-----------------------|
|  |          | Lat. N.   | Long. W.  | Air.         | Surface. | Bottom. |        |                       |
| Off Alaska.                                      |          |           |           |              |          |         |        |                       |
| 1893.  |          |           |           |              |          |         |        |                       |
| 3475   | Sept. 15 | 57 11 00  | 146 41 00 | 57           | 51       | 35      | 2,320  | gy. oz.               |
| 3476   | Sept. 15 | 57 15 00  | 145 52 00 | 56           | 51       | 34.6    | 2,150  | gy. oz.               |
| 3477   | Sept. 15 | 57 18 00  | 145 05 00 | 59           | 52       | 35.1    | 2,149  | gy. oz.               |
| 3478   | Sept. 15 | 57 20 00  | 144 17 00 | 53           | 51       | 35.1    | 2,119  | gy. oz.               |
| 3479   | Sept. 16 | 57 20 00  | 143 27 00 | 53           | 51       | 35.1    | 2,099  | gy. oz.               |
| 3480   | Sept. 16 | 57 17 00  | 142 28 00 | 53           | 51       | 35.1    | 2,034  | gy. oz.               |
| 3481   | Sept. 16 | 57 12 00  | 141 31 00 | 55           | 52       | 35.1    | 1,946  | lt. br. oz.           |
| 3482   | Sept. 16 | 57 09 30  | 140 37 00 | 58           | 54       | 35.1    | 1,826  | lt. br. oz.           |
| 3483   | Sept. 16 | 57 09 00  | 139 38 00 | 59           | 55       | 35.     | 1,868  | br. oz.               |
| 3484   | Sept. 16 | 57 07 00  | 138 40 00 | 54           | 53       | 35.1    | 1,724  | br. and gy. oz.       |
| 3485   | Sept. 17 | 57 04 00  | 137 43 00 | 53           | 51       | 35.1    | 1,553  | gy. oz.               |
| 3486   | Sept. 17 | 57 01 00  | 136 46 00 | 53           | 52       | 35.1    | 1,270  | br. m.                |
| 3487   | Sept. 17 | 57 00 00  | 136 12 30 | 55           | 53       | 38.9    | 756    | gn. m. s.             |
| 3488   | Sept. 17 | 56 58 40  | 135 47 30 | 55           | 54       | 45      | 55     | rky.                  |
| Western Aleutian islands.                        |          |           |           |              |          |         |        |                       |
| 1894.  |          |           |           |              |          |         |        |                       |
| 3489   |          |           | Long. E.  |              |          |         |        |                       |
| 3490   | June 6   | 52 46 30  | 175 27 00 | 44           | 40       | -----   | 2,237  | No specimen.          |
| 3491   | June 7   | 52 41 30  | 176 24 00 | 40           | 39       | 35      | 2,107  | br. m. fine s.        |
| Eastern Bering Sea.                              |          |           |           |              |          |         |        |                       |
| Long. W.   |          |           |           |              |          |         |        |                       |
| 3492   | June 29  | 57 59 00  | 166 04 00 | 44           | 38       | 33      | 32     | gy. s.                |
| 3493   | June 29  | 58 06 00  | 165 22 00 | 45           | 38       | 35.7    | 26     | fine gy. s.           |
| 3494   | June 29  | 58 24 00  | 163 38 00 | 40           | 37       | 34.5    | 21     | fine gy. s.           |
| 3495   | June 30  | 57 28 00  | 163 14 00 | 38           | 38       | 34      | 27     | fine gy. s.           |
| 3496   | June 30  | 56 59 00  | 163 02 00 | 42           | 40       | 32      | 34     | fine gy. s.           |
| 3497   | June 30  | 56 59 00  | 163 48 00 | 42           | 40       | 34.3    | 37     | fine gy. s.           |
| 3498   | June 30  | 56 58 00  | 165 15 00 | 41           | 38       | 34      | 44     | gn. m.                |
| 3499   | July 1   | 56 57 00  | 166 33 00 | 39           | 39       | 34      | 40     | gn. m.                |
| 3500   | July 1   | 56 54 00  | 167 51 00 | 39           | 39       | -----   | 44     | gy. s.                |
| 3501   | July 1   | 57 52 00  | 167 19 00 | 42           | 43       | 37      | 37     | gn. m.                |
| 3502   | July 13  | 56 35 00  | 168 18 00 | 43           | 41       | -----   | 59     | s. m.                 |
| South of Unimak Id. and north of Sannak islands. |          |           |           |              |          |         |        |                       |
| 3503   | July 15  | 54 24 00  | 163 51 00 | 43           | 41       | -----   | 43     | crs. bk. s.           |
| 3504   | July 15  | 54 26 00  | 163 44 00 | 43           | 41       | 37.3    | 54     | fine. bk. s.          |
| 3505   | July 15  | 54 29 00  | 163 37 00 | 43           | 41       | 37      | 57     | crs. bk. s. p.        |
| 3506   | July 15  | 54 30 30  | 163 29 00 | 43           | 40       | 37      | 59     | bk. s. p.             |
| 3507   | July 15  | 54 32 30  | 163 21 00 | 43           | 40       | 39      | 60     | bk. s.                |
| 3508   | July 15  | 54 34 30  | 163 14 00 | 43           | 39       | 38      | 41     | bk. g.                |
| 3509   | July 15  | 54 36 00  | 163 06 00 | 43           | 39       | 41      | 46     | gy. s.                |
| 3510   | July 15  | 54 37 00  | 163 02 00 | 43           | 39       | 40      | 25     | gy. s.                |
| 3511   | July 15  | 54 37 30  | 163 01 00 | 43           | 39       | 39      | 30     | gy. s.                |
| 3512   | July 15  | 54 38 00  | 162 59 00 | 43           | 39       | 40      | 38     | rky.                  |
| 3513   | July 15  | 54 40 30  | 163 00 00 | 43           | 39       | 38      | 30     | bk. s. g.             |
| 3514   | July 15  | 54 46 30  | 163 08 00 | 43           | 39       | 38      | 46     | gn. m.                |
| 3515   | July 22  | 54 40 00  | 163 01 00 | 48           | 41       | 40.1    | 23     | rky.                  |
| 3516   | July 22  | 54 38 00  | 162 58 30 | 47           | 40       | -----   | 50     | bk. s. p.             |
| 3517   | July 22  | 54 35 00  | 162 55 40 | 48           | 41       | -----   | 38     | rky.                  |
| 3518   | July 22  | 54 32 30  | 162 53 00 | 49           | 42       | 41      | 33     | sh.                   |
| 3519   | July 22  | 54 28 15  | 162 49 00 | 49           | 42       | 41.2    | 33     | rky.                  |
| Northern portion of Bering Sea.                  |          |           |           |              |          |         |        |                       |
| 3520   | Aug. 3   | 58 18 00  | 175 57 00 | 49           | 43       | 35      | 1,363  | gy. oz. fine s.       |
| 3521   | Aug. 3   | 58 27 00  | 176 51 00 | 50           | 43       | 35.6    | 1,279  | gy. oz. fine s.       |
| 3522   | Aug. 3   | 58 37 00  | 177 45 00 | 49           | 43       | 36.4    | 717    | gn. in. s.            |
| 3523   | Aug. 3   | 58 40 00  | 178 03 00 | 50           | 43       | 38      | 319    | r. fine gy. s.        |
| 3524   | Aug. 3   | 58 42 00  | 178 12 00 | 49           | 43       | 38      | 369    | fine gy. s.           |
| 3525   | Aug. 4   | 58 45 00  | 178 30 00 | 48           | 43       | 35      | 1,231  | fine gy. s.           |
| 3526   | Aug. 4   | 58 48 00  | 178 49 00 | 46           | 42       | 35      | 1,830  | gn. m. fine s.        |
| 3527   | Aug. 4   | 58 52 00  | 179 07 00 | 46           | 42       | 35.1    | 1,812  | gy. oz.               |
| 3528   | Aug. 4   | 58 56 00  | 179 25 00 | 46           | 42       | 35      | 1,838  | gy. oz.               |
| 3529   | Aug. 4   | 59 25 00  | 179 13 00 | 55           | 44       | 35      | 1,765  | gy. oz. fine s.       |
| 3530   | Aug. 4   | 59 55 00  | 179 01 00 | 47           | 44       | 36.3    | 713    | gy. oz. fine s.       |
| 3531   | Aug. 4   | 60 25 00  | 178 49 00 | 48           | 44       | 38      | 183    | gn. m. fine s.        |
| 3532   | Aug. 7   | 58 00 00  | 172 58 00 | 51           | 45       | 36      | 61     | fine. dk. s.          |
| South of Alaska Peninsula.                       |          |           |           |              |          |         |        |                       |
| 3533   | June 13  | 55 31 00  | 159 23 00 | 46           | 42       | -----   | 100    | fine. bk. g.          |
| Bering Sea, south of St. Paul Island.            |          |           |           |              |          |         |        |                       |
| 3534   | June 24  | 56 59 30  | 170 24 30 | 36           | 37       | -----   | 20     | fine. bk. s.          |
| 3535   | June 24  | 57 01 00  | 170 26 20 | 36           | 37       | -----   | 38     | fine. bk. s. brk. sh. |

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.  |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|--|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.  | Long. W.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Bering Sea, south<br>of St. Paul Isd.                    |           |              |               |              |        |                      |
|            | 1895.   | ° ' "  | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 3536       | June 24 | 57 04 00   | 170 30 45 | 36           | 37            | -----        | 33     | rky.                 |
| 3537       | June 24 | 57 04 45   | 170 29 15 | 36           | 37            | -----        | 36     | fne. bk. g.          |
| 3538       | June 24 | 57 05 30   | 170 27 45 | 40           | 35            | -----        | 25     | fne. gy. s. p.       |
| 3539       | June 24 | 57 06 00   | 170 26 30 | 40           | 35            | -----        | 29     | fne. gy. s. sh.      |
| 3540       | June 24 | 57 06 40   | 170 25 00 | 40           | 35            | -----        | 32     | bk. p.               |
| 3541       | June 24 | 57 07 30   | 170 23 20 | 42           | 34            | -----        | 19     | fne. gy. s.          |
|            |         | Bering Sea betw.<br>Pribilof and Com-<br>mander islands. |           |              |               |              |        |                      |
| 3542       | June 26 | 56 53 00   | 172 15 00 | 37           | 39            | 38.9         | 66     | fne. s. m.           |
| 3543       | June 27 | 56 00 00   | 177 30 00 | 40           | 40            | 35.1         | 2,056  | No specimen.         |
| 3544       | June 28 | 56 02 00   | 178 50 00 | 40           | 40            | 35.1         | 2,083  | No specimen.         |
| 3545       | June 29 | 55 45 00   | 179 57 00 | 40           | 39            | 35.1         | 2,086  | br. m. oz.           |
|            |         | Long. E.   |           |              |               |              |        |                      |
| 3546       | June 30 | 55 59 00   | 178 43 00 | 43           | 41            | 35.1         | 2,105  | br. m. oz.           |
| 3547       | June 30 | 55 55 00   | 177 12 00 | 40           | 41            | 35.6         | 2,113  | br. m. oz.           |
| 3548       | July 1  | 55 52 00   | 177 25 00 | 38           | 40            | 35.1         | 2,120  | br. m. oz.           |
| 3549       | July 1  | 55 53 00   | 173 53 00 | 45           | 43            | 35.2         | 2,111  | br. m. oz.           |
| 3550       | July 2  | 55 59 00   | 171 57 00 | 42           | 44            | 35.1         | 2,086  | br. m. oz.           |
| 3551       | July 2  | 56 00 00   | 169 46 00 | 45           | 44            | 35.1         | 2,154  | br. m. oz.           |
| 3552       | July 2  | 56 00 00   | 168 16 00 | 43           | 43            | 35.1         | 2,153  | br. m.               |
| 3553       | July 2  | 55 58 00   | 166 43 00 | 42           | 43            | 35.1         | 2,119  | gy. s. m.            |
| 3554       | July 3  | 55 43 00   | 166 15 00 | 42           | 43            | 35.1         | 2,090  | gy. s. m.            |
| 3555       | July 3  | 55 25 00   | 165 46 00 | 41           | 43            | 34.3         | 70     | gy. s. m.            |
| 3556       | July 3  | 55 16 00   | 165 32 30 | 42           | 43            | -----        | 20     | crs. s. rky.         |
| 3557       | July 3  | 55 12 00   | 165 38 00 | 42           | 43            | -----        | 35     | gy. s.               |
| 3558       | July 3  | 55 11 00   | 165 40 00 | 42           | 43            | -----        | 37     | gy. s.               |
| 3559       | July 3  | 55 11 20   | 165 46 20 | 42           | 43            | -----        | 15     | rky.                 |
| 3560       | July 5  | 55 25 30   | 165 48 00 | 45           | 44            | 35.1         | 144    | fne. gy. s.          |
| 3561       | July 5  | 55 27 00   | 165 49 00 | 45           | 44            | 34.6         | 66     | rky.                 |
| 3562       | July 5  | 55 28 30   | 165 51 30 | 45           | 44            | 38.1         | 341    | gy. s. m.            |
| 3563       | July 5  | 55 32 00   | 165 56 30 | 45           | 45            | 35.1         | 1,087  | g.                   |
| 3564       | July 6  | 56 25 00   | 167 52 00 | 43           | 45            | 35           | 2,137  | gn. oz.              |
| 3565       | July 6  | 56 56 00   | 169 06 00 | 43           | 44            | 35           | 1,866  | bl. m. oz.           |
| 3566       | July 6  | 57 16 00   | 169 41 00 | 45           | 44            | 36           | 972    | bl. m. oz.           |
| 3567       | July 6  | 57 29 00   | 170 09 00 | 46           | 44            | -----        | 410    | gy. s. m.            |
| 3568       | July 6  | 57 35 00   | 170 24 00 | 45           | 43            | 38.1         | 537    | br. oz. g.           |
| 3569       | July 6  | 57 41 00   | 170 39 00 | 45           | 42            | 38           | 609    | br. oz. s.           |
| 3570       | July 6  | 57 47 00   | 170 54 00 | 44           | 42            | 37           | 540    | gn. oz. g.           |
| 3571       | July 6  | 57 53 00   | 171 09 00 | 43           | 42            | 36.5         | 696    | gn. m. oz.           |
| 3572       | July 7  | 58 13 00   | 171 51 00 | 42           | 42            | 35           | 1,469  | gn. m. oz.           |
| 3573       | July 7  | 58 36 00   | 172 47 00 | 42           | 41            | 35           | 1,898  | hrd.                 |
| 3574       | July 7  | 58 23 00   | 174 17 00 | 45           | 42            | 38.7         | 1,978  | bl. m. oz.           |
| 3575       | July 7  | 58 12 00   | 175 49 00 | 48           | 43            | 35           | 2,041  | br. m. oz.           |
| 3576       | July 7  | 58 01 00   | 177 21 00 | 44           | 42            | 19           | 2,068  | br. m. oz.           |
| 3577       | July 7  | 57 49 00   | 178 50 00 | 42           | 42            | 35           | 2,080  | br. m. oz.           |
|            |         | Long. W.   |           |              |               |              |        |                      |
| 3578       | July 7  | 57 38 00   | 179 42 00 | 44           | 42            | -----        | 2,084  | br. m. oz.           |
| 3579       | July 7  | 57 34 00   | 179 16 00 | 43           | 41            | 35           | 2,076  | gn. m.               |
| 3580       | July 7  | 57 30 00   | 178 50 00 | 43           | 41            | 35           | 2,059  | gn. m.               |
| 3581       | July 7  | 57 23 00   | 178 17 00 | 41           | 41            | 35.2         | 2,059  | gn. m.               |
| 3582       | July 8  | 57 13 00   | 177 07 00 | 41           | 41            | 35.1         | 1,994  | gn. m.               |
| 3583       | July 8  | 57 03 00   | 176 00 00 | 41           | 41            | 35           | 1,803  | gn. m. fne. s.       |
| 3584       | July 8  | 56 54 00   | 174 50 00 | 42           | 42            | 35           | 1,825  | No specimen.         |
| 3585       | July 8  |  |           |              |               |              |        |                      |
|            |         | Bering Sea betw.<br>Pribilof and<br>Aleutian islands.    |           |              |               |              |        |                      |
| 3586       | Aug. 4  | 53 59 00   | 166 29 00 | 46           | 46            | 39.2         | 76     | gn. m. s.            |
| 3587       | Aug. 4  | 54 01 30   | 166 30 30 | 46           | 43            | 38.8         | 98     | fne. gy. s. bk. sp.  |
| 3588       | Aug. 4  | 54 03 30   | 166 31 30 | 46           | 45            | -----        | 93     | gy. s. g.            |
| 3589       | Aug. 4  | 54 00 30   | 169 20 30 | 45           | 45            | 35.5         | 1,003  | gn. m. bk. s.        |
| 3590       | Aug. 5  | 54 30 00   | 169 31 00 | 44           | 45            | 35.5         | 1,491  | gn. m.               |
| 3591       | Aug. 5  | 54 59 00   | 169 41 00 | 46           | 45            | 35           | 1,676  | gn. m. fne. s.       |
| 3592       | Aug. 5  | 55 12 00   | 168 47 00 | 46           | 44            | 35.2         | 1,035  | br. oz.              |
| 3593       | Aug. 6  | 55 34 00   | 169 22 00 | 46           | 45            | 34.7         | 1,315  | br. oz.              |
| 3594       | Aug. 7  | 55 10 00   | 170 56 00 | 45           | 44            | 34.7         | 1,664  | br. oz.              |
| 3595       | Aug. 8  | 55 12 00   | 171 48 00 | 44           | 45            | 35.2         | 1,819  | br. oz.              |
| 3596       | Aug. 8  | 55 32 00   | 172 17 00 | 43           | 43            | 35.5         | 1,901  | br. oz.              |
| 3597       | Aug. 10 | 56 15 00   | 172 35 00 | 46           | 45            | 36           | 1,267  | gn. m. s.            |
| 3598       | Aug. 10 | 56 28 00   | 172 39 00 | 45           | 44            | 38.1         | 296    | gn. m. s.            |
| 3599       | Aug. 10 | 56 29 00   | 172 39 00 | 45           | 45            | 38.1         | 200    | gn. m. s.            |
| 3600       | Aug. 10 | 56 30 00   | 172 40 00 | 45           | 45            | 37.1         | 156    | gn. m. s.            |
| 3601       | Aug. 10 | 56 31 00   | 172 40 00 | 45           | 44            | 37.1         | 110    | gn. m. s.            |
| 3602       | Aug. 11 | 55 53 00   | 171 42 00 | 45           | 44            | 35.1         | 1,496  | gn. m. s.            |
| 3603       | Aug. 12 | 54 39 00   | 170 19 00 | 46           | 44            | 35.3         | 1,025  | gn. oz.              |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No.   | Date.           | Position. |                       | Temperature. |               |              | Depth. | Character of bottom.  |
|--|-----------------|-----------|-----------------------|--------------|---------------|--------------|--------|-----------------------|
|  |                 | Lat. N.   | Long. W.              | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                       |
| Bering Sea betw.<br>Pribilof and<br>Aleutian isds.                     |                 |           |                       |              |               |              |        |                       |
| 1895.  |                 |           |                       |              |               |              |        |                       |
| 3604   | Aug. 12         | 54 46 00  | 169 29 00             | 45           | 45            | 35.2         | 1,355  | gn. oz.               |
| 3605   | Aug. 12         | 55 01 00  | 168 33 00             | 44           | 45            | 35.1         | 1,162  | gn. m. s.             |
| 3606   | Aug. 13         | 54 54 00  | 168 13 00             | 44           | 44            | 35.5         | 1,132  | gn. m. s.             |
| 3607   | Aug. 13         | 54 41 00  | 168 01 00             | 44           | 45            | 37.1         | 823    | gn. m. s.             |
| 3608   | Aug. 13         | 54 41 00  | 168 25 00             | 44           | 45            | 35.3         | 1,122  | gn. m. s.             |
| 3609   | Aug. 13         | 55 09 00  | 167 40 00             | 45           | 45            | 37.5         | 189    | gn. m. s.             |
| 3610   | Aug. 13         | 55 32 00  | 167 50 00             | 46           | 44            | 38.1         | 110    | fne. gy. s.           |
| 3611   | Aug. 13         | 55 32 00  | 168 11 00             | 45           | 45            | 38.9         | 83     | fne. gy. s. bk. sp.   |
| 3612   | Aug. 13         | 55 42 00  | 168 32 00             | 45           | 45            | 38.3         | 76     | bn. m. fne. s.        |
| 3613   | Aug. 18         | 54 14 00  | 166 54 30             | 52           | 46            | 36.3         | 778    | gn. m. bk. s.         |
| 3614   | Aug. 18         | 54 25 00  | 167 13 00             | 50           | 46            | 38.1         | 334    | gn. m. s.             |
| 3615   | Aug. 18         | 54 25 00  | 167 38 00             | 45           | 46            | 37.1         | 486    | gn. m. s.             |
| 3616   | Aug. 19         | 54 11 30  | 167 50 00             | 44           | 42            | 35.2         | 1,048  | gn. m. s.             |
| 3617   | Aug. 19         | 54 24 00  | 168 02 00             | 44           | 42            | 37.1         | 538    | gn. m. s.             |
| 3618   | Aug. 19         | 54 10 00  | 168 14 00             | 44           | 42            | 35.5         | 1,075  | gn. m. bk. s.         |
| 3619   | Aug. 19         | 54 06 00  | 168 37 00             | 45           | 43            | 35.3         | 1,231  | gn. m. s.             |
| 3620   | Aug. 19         | 54 17 00  | 168 53 30             | 45           | 43            | 35.6         | 1,014  | gn. m. bk. s.         |
| 3621   | Aug. 19         | 54 39 00  | 168 52 30             | 47           | 44            | 35.5         | 975    | gn. m. s.             |
| 3622   | Aug. 19         | 54 53 00  | 169 19 00             | 46           | 45            | 35.1         | 1,471  | gn. m. s.             |
| 3623   | Aug. 20         | 55 11 00  | 168 30 30             | 47           | 45            | 35.9         | 944    | gn. m.                |
| 3624   | Aug. 20         | 55 32 00  | 168 36 00             | 48           | 47            | 38.1         | 273    | gn. m. s.             |
| 3625   | Aug. 20         | 55 19 30  | 168 09 00             | 46           | 45            | 38.1         | 229    | gn. m. fne. s.        |
| 3626   | Aug. 20         | 55 19 30  | 168 10 00             | 46           | 45            | 38.1         | 244    | gy. s.                |
| 3627   | Aug. 20         | 55 17 00  | 168 01 00             | 46           | 45            | 38           | 219    | fne. gy. s.           |
| 3628   | Aug. 20         | 55 23 00  | 167 48 00             | 47           | 47            | 37.8         | 90     | fne. gy. s. bk. sp.   |
| 3629   | Aug. 20         | 55 11 00  | 167 56 00             | 46           | 45            | 37.8         | 367    | gn. m. s.             |
| 3630   | Aug. 21         | 55 04 00  | 167 24 00             | 47           | 45            | 37.6         | 99     | bk. s.                |
| 3631   | Aug. 21         | 55 19 00  | 167 27 00             | 47           | 47            | 36.5         | 78     | fne. bk. s.           |
| 3632   | Aug. 21         | 55 30 00  | 167 51 00             | 46           | 46            | 37.6         | 74     | gn. m. s.             |
| 3633   | Aug. 21         | 55 41 00  | 168 34 00             | 46           | 46            | 37.8         | 77     | gn. m. s.             |
| 3634   | Aug. 21         | 55 43 00  | 168 42 00             | 46           | 45            | 38.4         | 89     | gy. s. m.             |
| 3635   | Aug. 21         | 55 44 00  | 168 47 00             | 46           | 45            | 37.8         | 141    | gy. s.                |
| 3636   | Aug. 21         | 55 43 00  | 168 44 00             | 47           | 45            | 38           | 108    | fne. gy. s.           |
| 3637   | Aug. 21         | 55 27 00  | 168 01 30             | 47           | 46            | 36.8         | 104    | fne. gy. s.           |
| 3638   | Aug. 22         | 55 42 00  | 166 09 00             | 47           | 46            | 37.5         | 68     | gn. m.                |
| 3639   | Aug. 22         | 56 31 00  | 166 59 00             | 48           | 47            | 35.3         | 57     | gn. m. s.             |
| 3640   | Aug. 24         | 56 02 00  | 169 06 30             | 47           | 45            | 37.9         | 77     | gn. m. s.             |
| 3641   | Aug. 24         | 54 57 30  | 167 14 00             | 48           | 47            | 37.7         | 137    | gn. m. s.             |
| 3642   | Aug. 24         | 54 56 00  | 167 02 30             | 47           | 46            | 37.3         | 116    | gn. m. s.             |
| 3643   | Aug. 24         | 54 55 30  | 166 57 30             | 46           | 46            | 37.3         | 113    | gn. m. s.             |
| 3644   | Aug. 24         | 54 57 00  | 166 53 00             | 46           | 46            | 37.8         | 93     | gn. m. s.             |
| 3645   | Aug. 24         | 54 52 00  | 166 43 30             | 46           | 46            | 37.5         | 113    | gn. m.                |
| 3646   | Aug. 24         | 54 54 00  | 166 35 30             | 47           | 46            | 37.5         | 90     | gn. m. s.             |
| 3647   | Aug. 24         | 54 49 30  | 166 26 30             | 46           | 46            | 37.3         | 106    | gn. m. s.             |
| 3648   | Aug. 24         | 54 50 30  | 166 21 30             | 47           | 46            | 37.8         | 95     | gn. m. s.             |
| 3649   | Aug. 25         | 54 41 00  | 166 15 30             | 47           | 45            | 37.7         | 171    | rky.                  |
| 3650   | Aug. 25         | 54 32 00  | 166 09 00             | 47           | 45            | 37.8         | 264    | rky.                  |
| 3651   |                 |           |                       |              |               |              |        |                       |
| Off Southern Cal-<br>ifornia, west of<br>Cortez and Tan-<br>ner banks. |                 |           |                       |              |               |              |        |                       |
| 3652   | Apr. 13         | 33 06 00  | 119 17 00             | 58           | 56            | 39.1         | 892    | fne. s. m.            |
| 3653   | Apr. 13         | 32 38 00  | 119 36 00             | 55           | 55            | 45.4         | 180    | fne. gy. s.           |
| 3654   | Apr. 13         | 32 30 00  | 119 43 00             | 55           | 55            | 38.6         | 659    | crs. gy. s.           |
| Eastern portion<br>of Bering Sea<br>south of Pribi-<br>lof Islands.    |                 |           |                       |              |               |              |        |                       |
| b 3655   | 1896.<br>July 7 | 54 51 00  | 167 46 00             | 43           | 43            | 36.4         | 671    | gn. m. bk. vol. s.    |
| From Bering Isd.<br>to Kamchatka<br>coast. a                           |                 |           |                       |              |               |              |        |                       |
| c 3660   | Aug. 9          | 55 11 30  | Long. E.<br>165 39 00 | 52           | 48            | -----        | 41     | fne. gy. s. bk. sh.   |
| 3661   | Aug. 9          | 55 08 30  | 165 26 00             | 49           | 49            | 35           | 2,250  | fne. gy. s. bk. p. c. |
| 3662   | Aug. 9          | 54 49 42  | 164 36 00             | 52           | 49            | 35           | 2,665  | m. fne. dk. s. p.     |
| 3663   | Aug. 10         | 54 51 00  | 163 46 00             | 54           | 49            | 35.2         | 3,117  | bn. m. fne. dk. s.    |

a Except station Hy. 3660, geographical positions on this line are independent of shore features.

b No records for Nos. 3656 to 3659, inclusive.

c Accepting position of Ari Kamen, Bering Island, as plotted on Stejneger's map, it bore NE. by E.  $\frac{1}{4}$  E. (mag.), distant 3 miles from Hy. 3660.

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Serial No. | Date.   | Position.  |           | Temperature. |               |              | Depth. | Character of bottom.    |
|------------|---------|--|-----------|--------------|---------------|--------------|--------|-------------------------|
|            |         | Lat. N.  | Long. E.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                         |
|            |         | From Bering Id.<br>to Kamchatka<br>coast.                                |           |              |               |              |        |                         |
|            | 1896.   | ° ' "  | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                         |
| a 3664     | Aug. 10 | 54 42 30   | 162 55 00 | 57           | 50            | 35           | 2,077  | bn. m. dk. s. p.        |
| b 3665     | Aug. 10 | 54 35 00   | 162 11 30 | 53           | 44            | 38           | 473    | bn. m. dk. s. p.        |
| c 3666     | Aug. 10 | 54 32 30   | 161 58 30 | 53           | 44            | 37.4         | 586    | bn. m. fine. s. p.      |
| d 3667     | Aug. 10 | 54 29 00   | 161 50 00 | 54           | 45            | 37           | 453    | bn. m. dk. s. p.        |
|            |         | Southeast coast of<br>Kamchatka. e                                       |           |              |               |              |        |                         |
| 3668       | Aug. 20 | 51 17 00   | 158 10 00 | 53           | 49            | 32.7         | 127    | gn. m. co. dk. s. p.    |
|            |         | Along Kuril Chain. f   |           |              |               |              |        |                         |
| 3669       | Aug. 21 | 48 43 00   | 154 31 00 | 44           | 41            | 36.7         | 425    | crs. dk. s.             |
| 3670       | Aug. 22 | 48 33 00   | 154 53 00 | 42           | 37            | 35.7         | 114    | hrd.                    |
| 3671       | Aug. 22 | 48 32 00   | 154 55 00 | 41           | 37            | -----        | 106    | brk. sh.                |
| 3672       | Aug. 22 | 48 36 00   | 153 59 00 | 45           | 42            | 36.7         | 304    | crs. g.                 |
| 3673       | Aug. 22 | 48 26 00   | 153 33 00 | 47           | 45            | 34.7         | 1,102  | crs. dk. s. p           |
| 3674       | Aug. 23 | 48 19 00   | 153 23 00 | 48           | 44            | 35.7         | 1,001  | bk. s. p.               |
| 3675       | Aug. 23 | 48 13 00   | 153 20 00 | 48           | 49            | 36.3         | 624    | bk. s.                  |
| g 3676     | Aug. 24 | 47 35 00   | 152 48 30 | 45           | 38            | 35.7         | 96     | rky.                    |
| (h)        |         | Sea of Okhotsk<br>from Lower Us-<br>hishir Island to<br>Robben Island. i |           |              |               |              |        |                         |
| j 3679     | Aug. 26 | 47 31 30   | 152 45 48 | 45           | 39            | 38.7         | 37     | p.                      |
| k 3680     | Aug. 26 | 47 31 30   | 152 39 00 | 45           | 40            | 35.7         | 685    | p.                      |
| l 3681     | Aug. 26 | 47 31 42   | 152 32 00 | 44           | 39            | 35.2         | 1,164  | fine. gy. s.            |
| m 3682     | Aug. 26 | 47 32 00   | 152 21 00 | 44           | 39            | 34.7         | 1,500  | bn. m. fine. gy. s.     |
| n 3683     | Aug. 26 | 47 33 00   | 152 07 00 | 47           | 39            | 35.2         | 1,712  | fine. gy. s.            |
| 3684       | Aug. 26 | 47 36 00   | 151 46 00 | 53           | 53            | -----        | 1,830  | bn. m. dk. s.           |
| 3685       | Aug. 26 | 47 40 30   | 151 05 00 | 49           | 50            | 35.7         | 1,836  | bn. m. fine. s.         |
| 3686       | Aug. 27 | 47 45 00   | 150 23 30 | 43           | 47            | 35.9         | 1,836  | bn. m. fine. s.         |
| 3687       | Aug. 27 | 47 50 00   | 149 42 00 | 48           | 50            | 36           | 1,843  | bn. and yl. m. fine. s. |
| 3688       | Aug. 27 | 47 55 30   | 148 56 00 | 55           | 55            | 35.8         | 1,562  | bn. m. fine. s.         |
| 3689       | Aug. 27 | 48 01 30   | 148 16 30 | 55           | 55            | 36           | 1,426  | bn. m. fine. s.         |
| 3690       | Aug. 27 | 48 08 00   | 147 34 00 | 56           | 56            | 36           | 964    | lt. bn. m. qtz. s.      |
| 3691       | Aug. 28 | 48 15 00   | 146 51 00 | 57           | 59            | 36           | 796    | lt. bn. m. qtz. s.      |
| 3692       | Aug. 28 | 48 21 00   | 146 08 00 | 58           | 56            | 36.2         | 698    | bn. m. fine. s.         |
| 3693       | Aug. 28 | 48 27 45   | 145 20 30 | 58           | 56            | 33           | 155    | bn. m. crs. vol. s.     |
| 3694       | Aug. 28 | 48 31 48   | 144 54 51 | 57           | 48            | 35           | 27     | fine. g. r. sh.         |
| 3695       | Aug. 28 | 48 29 00   | 144 42 30 | 58           | 51            | -----        | 16     | rky.                    |
|            |         | Sea of Okhotsk<br>from Robben Is-<br>land to Iturup<br>Island. o         |           |              |               |              |        |                         |
| 3696       | Sept. 2 | 48 22 00   | 144 41 00 | 55           | 47            | 40           | 20     | fine. s. p.             |
| 3697       | Sept. 2 | 48 05 00   | 145 01 00 | 54           | 55            | 31           | 71     | bl. m.                  |
| 3698       | Sept. 3 | 47 43 00   | 145 28 00 | 54           | 54            | 37           | 631    | gn. m. s.               |
| 3699       | Sept. 3 | 47 20 30   | 145 54 00 | 53           | 56            | 35.9         | 1,584  | gn. m. fine. s.         |

a Serial temperatures to 1,005 fathoms.

b 97° 33' Ext. Rt. Pt. to Cape Kosloff. 95° 08' first Pt. left of Ext. Rt. Pt. to Kosloff. 77° 02' Ext. Rt. Pt. to Mt. Kronotski.

c 102° 43' Ext. Rt. Pt. to Kosloff. 91° 03' Ext. Rt. Pt. to Kronotski. 5° 07' Kosloff to detached rock. Ext. Right Point, N. 16° E. (mag.). Mt. Kronotski, N. 74° W. (mag.). Cape Kosloff, N. 86° 15' W. (mag.).

d 73° 56' Ext. Rt. Pt. to Kosloff. 1° 12' Kosloff to detached rock. Cape Kosloff, N. 46° 30' W. (mag.).

e Geographical positions, approximate, without relation to shore features.

f Geographical positions, approximate, without relation to shore features, except station Hy. 3676.

g Position referred to obs. spot at Old Village, Lower Ushishir Island, as in lat. 47° 30' 56.8" N., long. 152° 47' 55" E., determined by this vessel,

h Nos. 3677 and 3678 missing.

i Geographical positions on this line referred to obs. spot at Old Village, Lower Ushishir Island, as in lat. 47° 30' 56.8" N., long. 152° 47' 55" E. Robben Island is assumed to be in lat. 48° 31' 30" N., long. 144° 43' 38" E.

j Babuskin Rock, south (true)  $\frac{1}{2}$  mile.

k SW. end Lower Ushishir, S. 68° E., true; S. end Ketoy, S. 48° W., true.

l SW. end Lower Ushishir, S. 80° E., true; S. end Ketoy, S. 28° W., true.

m SW. end Lower Ushishir, S. 92° E., true; S. end Ketoy, S. 14° E., true.

n Right end Ketoy, S. 44° E., true; North Ushishir Peak, S. 86° E., true.

The five preceding bearings are all independent of geographical positions of the stations and have not been adjusted.

o Positions on this line are geographical, without relation to shore features. Position given on B. A. chart No. 2405, of Shana Village, Iturup Island, is accepted. Lat. 45° 15' N., long. 147° 56' E.

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Serial No. | Date.   | Position.  |           | Temperature. |               |              | Depth. | Character of bottom. |
|------------|---------|--|-----------|--------------|---------------|--------------|--------|----------------------|
|            |         | Lat. N.  | Long. E.  | Air.         | Sur-<br>face. | Bot-<br>tom. |        |                      |
|            |         | Sea of Okhotsk<br>from Robben Is-<br>land to Iturup<br>Island.           |           |              |               |              |        |                      |
|            | 1896.   | ° ' "  | ° ' "     | ° F.         | ° F.          | ° F.         | Fms.   |                      |
| 3700       | Sept. 3 | 46 58 00   | 146 20 00 | 57           | 53            | 35.9         | 1,818  | gn. m. fine s.       |
| 3701       | Sept. 3 | 46 35 00   | 146 49 00 | 62           | 55            | 36           | 1,820  | lt. bn. m. s.        |
| 3702       | Sept. 3 | 46 15 00   | 147 07 00 | 55           | 55            | 35.8         | 1,817  | bn. m. fine s.       |
| 3703       | Sept. 4 | 45 48 00   | 147 22 00 | 53           | 54            | 36           | 1,825  | gn. m. fine s.       |
| 3704       | Sept. 4 | 45 40 00   | 147 28 00 | 53           | 53            | 35.9         | 1,761  | gn. m. fine s.       |
| 3705       | Sept. 4 | 45 31 30   | 147 32 30 | 53           | 54            | 36           | 1,078  | bn. m. fine s.       |
| 3706       | Sept. 4 | 45 23 00   | 147 39 30 | 54           | 54            | 36           | 1,107  | bn. m. fine s.       |
| 3707       | Sept. 4 | 45 18 00   | 147 42 00 | 54           | 54            | 36.5         | 668    | bn. m. crs. s.       |
|            |         | Sea of Okhotsk<br>from Iturup Is-<br>land toward La<br>Perouse Straits.* |           |              |               |              |        |                      |
| 3708       | Sept. 6 | 45 16 00   | 147 52 00 | 64           | 58            | 50           | 27     | dk. gy. s.           |
| 3709       | Sept. 6 | 45 16 30   | 147 45 00 | 64           | 58            | 35.7         | 312    | gn. m. fine s.       |
| 3710       | Sept. 6 | 45 18 00   | 147 31 00 | 60           | 55            | 36           | 810    | gn. m. s.            |
| 3711       | Sept. 6 | 45 19 00   | 147 09 00 | 60           | 54            | 36           | 1,641  | gn. m. fine s.       |
| 3712       | Sept. 6 | 45 21 00   | 146 27 00 | 60           | 58            | 35.8         | 1,744  | gn. m. fine s.       |
| 3713       | Sept. 7 | 45 23 00   | 145 46 00 | 61           | 58            | 36           | 1,700  | gn. m. s.            |
| 3714       | Sept. 7 | 45 25 00   | 145 02 00 | 60           | 57            | 35.9         | 1,649  | gn. m. s.            |
| 3715       | Sept. 7 | 45 27 00   | 144 21 00 | 62           | 54            | 36.5         | 468    | gn. m. crs. s. p.    |
| 3716       | Sept. 7 | 45 31 00   | 143 38 00 | 62           | 56            | 33           | 122    | gy. s.               |
| 3717       | Sept. 7 | 45 34 00   | 143 12 00 | 61           | 57            | 34           | 68     | gn. m.               |
| 3718       | Sept. 7 | 45 36 30   | 142 58 00 | 60           | 59            | 32           | 62     | gn. m.               |
|            |         | Santa Catalina Is-<br>land, California.                                  |           |              |               |              |        |                      |
|            | 1897.   | Lat. N.  | Long. W.  |              |               |              |        |                      |
|            | Apr. 6  | Entrance to Isth-<br>mus Cove.   |           | 60           | 56            | -----        | 12-15  | gy. s. sh. rky.      |
|            | Apr. 7  | 1½ E. by N. of<br>Avalon, Dakins<br>Cove.                                |           | 66           | 59            | -----        | 48     | fine gy. s.          |
| 3719       | Apr. 7  | do.-----   |           | 66           | 59            | -----        | 48     | fine gy. s.          |
| 3720       | Apr. 7  | 1½ E. by N. of<br>Avalon, Dakins<br>Cove.                                |           | 66           | 59            | -----        | 47     | fine gy. s.          |
|            | Apr. 7  | Off east end Santa<br>Catalina Island.                                   |           | 66           | 59            | -----        | 52     | fine gy. s.          |
|            | Apr. 7  | South of east end<br>Santa Catalina<br>Island.                           |           | 66           | 59            | -----        | 44     | fine gy. s.          |
|            | Apr. 7  | do.-----   |           | 66           | 59            | -----        | 38     | fine gy. s. hk. sh.  |
|            | Apr. 8  | Off east end Santa<br>Catalina Island.                                   |           | 66           | 58            | 51.7         | 50     | fine gy. s.          |
|            | Apr. 8  | do.-----   |           | 66           | 58            | 52           | 50     | fine gy. s.          |
|            | Apr. 8  | Rocks, east en-<br>trance Dakins<br>Cove.                                |           | 72           | 59            | -----        | (?)    | rky.                 |
| 3721       | Apr. 9  | 33 17 20   118 24 40   |           | 69           | 60            | -----        | 77-132 | rky.                 |
| 3721a      | Apr. 9  | Near preceding<br>position.  |           | 72           | 60            | -----        | 77-132 | rky.                 |
|            |         | Monterey Bay and<br>vicinity, Cal.                                       |           |              |               |              |        |                      |
|            | Apr. 12 | Anchorage, Santa<br>Cruz.  |           | 62           | 55            | -----        | 6      | gy. s. m.            |
| 3722       | Apr. 13 | 36 44 30   121 52 00   |           | 57           | 55            | 49           | 45     | gy. s. m.            |
|            | Apr. 13 | Anchorage, Mon-<br>terey Harbor.   |           | 64           | 58            | -----        | 6      | s. m.                |
|            | Apr. 14 | do.-----   |           | 58           | 55            | -----        | 6      | s. m.                |
|            | Apr. 17 | do.-----   |           | 58           | 56            | -----        | 7      | s. m.                |
|            | Apr. 18 | do.-----   |           | 61           | 54            | -----        | 7      | s. m.                |
| 3723       | Apr. 22 | 36 56 30   122 09 00   |           | 52           | 51            | -----        | 26     | gy. s.               |
| 3724       | Apr. 24 | 37 37 30   123 02 00   |           | 60           | 51            | 49           | 68     | gy. s. co. r.        |
| 3725       | Apr. 24 | 37 41 00   123 03 00   |           | 60           | 51            | 49           | 45     | rky.                 |
| 3726       | Apr. 24 | 37 41 00   123 04 00   |           | 60           | 51            | 49           | 50     | rky.                 |
| +3727      | Apr. 24 | 37 41 00   123 00 00   |           | 60           | 51            | 49           | 30-40  | rky.                 |

\* Positions geographical, without relation to shore features. Position given on B. A. chart No. 2405, of Shana Village, Iturup Island, is accepted. Lat. 45° 15' N., long. 147° 56 E.

† Numbers 3728 to 3777, inclusive, missing from the records.

## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Nos.                             |      | Date.    | Position.  |           | Temp. |       | Depth. | Character of bottom.            |
|----------------------------------|------|----------|--|-----------|-------|-------|--------|---------------------------------|
| Ser.                             | A.A. |          | Lat. N.  | Long. W.  | Surf. | Bot.  |        |                                 |
| California to Marquesas Islands. |      |          |  |           |       |       |        |                                 |
| 1899.                            |      |          |  |           |       |       |        |                                 |
|                                  |      |          | ° ' "  | ° ' "     | ° F.  | ° F.  | Fms.   |                                 |
| 3778                             | 1    | Aug. 26  | 31 10 00   | 125 00 00 | 64    | ----- | 1,955  | No specimen.                    |
| 3779                             | 4    | Aug. 29  | 24 45 00   | 130 16 00 | 68    | 34.6  | 2,628  | lt. br. vol. oz.                |
| 3780                             | 5    | Aug. 30  | 22 42 00   | 131 54 00 | 70    | 34.6  | 2,740  | br. vol. oz.                    |
| 3781                             | 6    | Aug. 31  | 20 26 00   | 133 28 00 | 75    | ----- | 2,810  | dk. br. vol. oz.                |
| 3782                             | 7    | Sept. 1  | 18 19 00   | 134 57 00 | 76    | ----- | 2,881  | dk. br. vol. oz.                |
| 3783                             | 8    | Sept. 2  | 17 13 00   | 136 09 00 | 76    | ----- | 2,766  | No specimen.                    |
| 3784                             | 9    | Sept. 2  | 16 52 00   | 136 12 00 | 76    | ----- | 3,003  | No specimen.                    |
| 3785                             | 11   | Sept. 3  | 14 38 00   | 136 44 00 | 79    | ----- | 2,646  | lt. br. vol. oz.                |
| 3786                             | 12   | Sept. 4  | 12 07 00   | 137 18 00 | 81    | ----- | 2,883  | lt. br. rad. oz.                |
| 3787                             | 14   | Sept. 7  | 6 41 00  | 137 00 00 | 82    | ----- | 2,776  | lt. gy. glob. oz.               |
| 3788                             | 15   | Sept. 8  | 4 35 00  | 136 54 00 | 80    | ----- | 2,583  | lt. gy. oz. glob. rad.          |
| 3789                             | 16   | Sept. 9  | 2 38 00  | 137 22 00 | 80    | 35.2  | 2,440  | lt. gy. glob. oz.               |
| Lat. S.                          |      |          |  |           |       |       |        |                                 |
| 3790                             | 18   | Sept. 13 | 6 25 00  | 138 59 00 | 80    | 35    | 2,475  | lt. gy. glob. oz.               |
| 3791                             | 19   | Sept. 13 | 7 58 00  | 139 09 00 | 79    | ----- | 2,287  | gy. yl. oz. crs. glob.          |
| 3792                             | 20   | Sept. 14 | 8 13 00  | 139 10 00 | 79    | 35.1  | 2,267  | gy. yl. oz. crs. glob.          |
| 3793                             | 21   | Sept. 14 | 8 28 00  | 139 12 00 | 79    | ----- | 2,183  | gy. yl. oz. crs. glob.          |
| 3794                             | 22   | Sept. 14 | 8 31 00  | 139 26 00 | 79    | ----- | 1,939  | gy. yl. oz. crs. glob.          |
| 3795                             | 23   | Sept. 14 | 8 33 00  | 139 36 00 | 80    | 35.5  | 1,802  | gy. yl. oz. crs. glob.          |
| 3796                             | 24   | Sept. 14 | Haunau Point, Ua Huka Island, Marquesas, S. 43° E., 15½ m. |           | 80    | ----- | 1,040  | gn. oz. lav.                    |
| 3797                             | 25   | Sept. 14 | Haunau Point, Ua Huka Island, E., dist. 17 m.              |           | 80    | ----- | 1,173  | gy. vol. oz.                    |
| 3798                             | 27   | Sept. 15 | Cape Martin, Nukuhiva Isl., N. 30° E., dist. 6½ m.         |           | 80    | 39.5  | 687    | drab vol. oz. glob.             |
| 3799                             | 28   | Sept. 17 | Chichikoff Point, Nukuhiva Isl., N. 13° E., 8 m.           |           | 80    | ----- | 1,284  | vol. r.                         |
| 3800                             | 29   | Sept. 17 | 9 16 00  | 140 25 00 | 80    | 34.9  | 1,932  | lt. gy. vol. oz. glob.          |
| 3801                             | 30   | Sept. 18 | 10 29 00   | 141 52 00 | 81    | 35    | 2,456  | lt. gy. vol. oz. glob.          |
| Paumotu Islands.                 |      |          |  |           |       |       |        |                                 |
| 3802                             | 32   | Sept. 20 | 13 37 00   | 145 42 00 | 80    | 35    | 2,451  | red c. foram.                   |
| 3803                             | 33   | Sept. 20 | Ent. Ahii Lagoon, S. 28° W., 22 m.                         |           | 81    | ----- | 2,527  | red c.                          |
| 3804                             | 34   | Sept. 20 | Ent. Ahii Lagoon, SE., 2.5 m.                              |           | 81    | ----- | 1,208  | lt. gy. oz. glob.               |
| 3805                             | 35   | Sept. 21 | 14 42 00   | 147 08 00 | 80    | ----- | 1,462  | lt. gy. oz. glob. frag.         |
| 3806                             | 36   | Sept. 21 | Ent. Avatoru Pass, Raihira Atoll, S. 44° W., 16 m.         |           | 80    | ----- | 706    | vol. r.                         |
| 3807                             | 37   | Sept. 24 | Ent. Avatoru Pass, Raihira Atoll, S., ¼ m.                 |           | 80    | ----- | 112    | wh. co. s.                      |
| 3808                             | 38   | Sept. 24 | Ent. Avatoru Pass, Raihira Atoll, S., 1.5 m.               |           | 80    | ----- | 604    | brk. sh.                        |
| 3809                             | 39   | Sept. 24 | Ent. Avatoru Pass, Raihira Atoll, S., 2.5 m.               |           | 80    | ----- | 645    | fne. wh. co. s.                 |
| 3810                             | 40   | Sept. 24 | Ent. Avatoru Pass, Raihira Atoll, S., 3.5 m.               |           | 80    | ----- | 661    | wh. co. s. glob. oz. min. frag. |
| 3811                             | 41   | Sept. 24 | Ent. Avatoru Pass, Raihira Atoll, S., 5.5 m.               |           | 81    | ----- | 684    | wh. co. s. glob. oz. min. frag. |
| 3812                             | 42   | Sept. 24 | Ent. Avatoru Pass, Raihira Atoll, S., 7.5 m.               |           | 81    | ----- | 819    | wh. co. s. glob. oz. vol. part. |
| 3813                             | 43   | Sept. 24 | 15 13 10   | 147 53 10 | 82    | ----- | 341    | wh. co. s. glob. pter.          |
| 3814                             | 44   | Sept. 24 | 15 14 10   | 147 51 5  | 82    | ----- | 391    | wh. co. s. sh. glob.            |
| 3815                             | 45   | Sept. 25 | 15 15 00   | 147 51 35 | 82    | ----- | 524    | wh. co. s. brk. sh.             |
| 3816                             | 46   | Sept. 24 | 15 16 50   | 147 52 30 | 80    | ----- | 450    | pter. oz. vol. part.            |
| 3817                             | 47   | Sept. 24 | 15 19 35   | 147 53 40 | 82    | ----- | 764    | wh. co. s. vol. part.           |
| 3818                             | 48   | Sept. 24 | 15 24 10   | 147 56 00 | 80    | ----- | 897    | glob. pter. vol. part.          |
| 3819                             | 49   | Sept. 25 | 15 25 00   | 148 08 00 | 80    | ----- | 1,123  | wh. co. s. glob. vol. part.     |
| 3820                             | 50   | Sept. 25 | 15 25 50   | 148 24 25 | 80    | ----- | 1,486  | glob. oz. vol. part.            |
| 3821                             | 51   | Sept. 25 | 15 02 00   | 148 24 00 | 80    | ----- | 488    | wh. co. s.                      |
| 3822                             | 52   | Sept. 25 | 15 01 40   | 148 25 00 | 80    | ----- | 670    | wh. co. s.                      |
| 3823                             | 53   | Sept. 25 | 15 01 00   | 148 27 00 | 81    | ----- | 782    | wh. pter. oz. vol. part.        |
| 3824                             | 54   | Sept. 25 | 15 00 20   | 148 30 00 | 81    | ----- | 850    | wh. pter. glob. oz.             |
| 3825                             | 55   | Sept. 25 | 14 58 35   | 148 35 00 | 81    | ----- | 844    | wh. glob. oz. mang. vol. part.  |



## Record of hydrographic soundings of the Albatross, etc.—Continued.

| Nos.             |      | Date.    | Position.   |           | Temp. |       | Depth. | Character of bottom.        |
|------------------|------|----------|---|-----------|-------|-------|--------|-----------------------------|
| Ser.             | A.A. |          | Lat. S.   | Long. W.  | Surf. | Bot.  |        |                             |
| Paumotu Islands. |      |          |   |           |       |       |        |                             |
|                  |      | 1899.    | ° ' "   | ° ' "     | ° F.  | ° F.  | Fms.   |                             |
| 3826             | 56   | Sept. 25 | 14 56 00  | 148 44 00 | 81    | ----- | 711    | wh. pter. oz.               |
| 3827             | 57   | Sept. 25 | 14 53 20  | 148 42 30 | 80    | ----- | 486    | crs. wh. co. s. vol. part.  |
| 3828             | 58   | Sept. 25 | 14 51 20  | 148 51 20 | 80    | ----- | 624    | wh. co. s.                  |
| 3829             | 59   | Sept. 25 | 14 56 00  | 148 48 00 | 80    | ----- | 860    | wh. co. s. glob. vol. part. |
| 3830             | 60   | Sept. 25 | 15 00 30  | 148 47 00 | 80    | ----- | 1,257  | wh. co. s. glob. vol. part. |
| 3831             | 61   | Sept. 25 | 15 16 00  | 148 46 00 | 79    | ----- | 1,762  | lt. gy. oz. glob.           |
| 3832             | 62   | Sept. 26 | 15 33 00  | 148 45 00 | 80    | ----- | 2,267  | lt. gy. oz. glob.           |
| 3833             | 63   | Sept. 26 | 15 42 00  | 148 44 00 | 80    | ----- | 2,243  | vol. m. glob.               |
| 3834             | 64   | Sept. 26 | West coast Makatea Id., E. 1.3 m.                   |           | 80    | ----- | 581    | crs. wh. co. s.             |
| 3835             | 65   | Sept. 26 | South coast Makatea Id., N. 5 m.                    |           | 80    | ----- | 1,363  | wh. co. s. mang. nods.      |
| 3836             | 66   | Sept. 26 | 16 10 00  | 148 26 00 | 80    | ----- | 2,238  | vol. m. glob. mang. nods.   |
| 3837             | 67   | Sept. 27 | 16 32 00  | 148 40 00 | 80    | ----- | 2,363  | vol. m. glob.               |
| 3838             | 68   | Sept. 27 | 16 57 00  | 148 58 00 | 79    | ----- | 2,224  | vol. m. glob.               |
| 3839             | 69   | Sept. 27 | 17 14 00  | 149 10 00 | 80    | ----- | 1,930  | no spec.                    |
| 3840             | 70   | Sept. 27 | 17 21 00  | 149 15 00 | 80    | ----- | 1,585  | vol. m.                     |
| 3841             | 71   | Sept. 27 | Point Venus, Tahiti Id., S. 32°, W. 4.2 m.          |           | 80    | ----- | 775    | crs. vol. s. mang. nods.    |
| 3842             | 72   | Sept. 27 | Point Venus, Tahiti Id., S. 54°, E. 4 m.            |           | 79    | ----- | 867    | co. vol. s.                 |
| 3843             | 73   | Oct. 5   | Point Venus, Tahiti Id., S. 55°, E. 3.8 m.          |           | 79    | ----- | 807    | fne. vol. s. m.             |
| 3844             | 75   | Oct. 5   | North shore, center Tetiaroa Atoll, S. 45°, W. 6 m. |           | 80    | ----- | 1,592  | gy. vol. m. glob. oz.       |
| 3845             | 76   | Oct. 6   | 15 56 20  | 147 40 00 | 80    | 35.0  | 2,269  | lt. br. vol. m.             |
| 3846             | 77   | Oct. 7   | 16 03 00  | 147 11 00 | 78    | 36.0  | 1,321  | glob. oz. vol. part.        |
| 3847             | 78   | Oct. 7   | 16 08 00  | 146 42 00 | 79    | 39.0  | 609    | glob. oz.                   |
| 3848             | 79   | Oct. 7   | Village west side Niau Atoll, E. ½ m.               |           | 79    | ----- | 252    | co. s. glob. oz.            |
| 3849             | 80   | Oct. 7   | Village west side Niau Atoll, NE. 1.75 m.           |           | 80    | ----- | 491    | co. s. pter. oz.            |
| 3850             | 81   | Oct. 7   | Niau Atoll, S. 3°, E. 14 m.                         |           | 80    | ----- | 677    | co. s. glob. oz.            |
| 3851             | 82   | Oct. 7   | Apataki, south end, N. 9 m.                         |           | 80    | ----- | 675    | pter. oz.                   |
| 3852             | 83   | Oct. 7   | Pakaka entrance Apataki Lagoon, NE. ½ m.            |           | 80    | ----- | 333    | co. s.                      |
| 3853             | 84   | Oct. 8   | Pakaka entrance Apataki Lagoon, N. 50°, E. 2 m.     |           | 80    | 39.4  | 613    | co. vol.                    |
| 3854             | 85   | Oct. 8   | Pakaka entrance Apataki Lagoon, N. 55°, E. 1 m.     |           | 80    | ----- | 520    | co. s.                      |
| 3855             | 86   | Oct. 8   | Northwest point Apataki, SE. 1 m.                   |           | 80    | 38.8  | 654    | crs. co. s.                 |
| 3856             | 87   | Oct. 8   | Northeast point Apataki, SW. 7 m.                   |           | 80    | ----- | 1,364  | crs. co. s.                 |
| 3857             | 88   | Oct. 9   | Center Tikei, Id., E. ½ m.                          |           | 80    | ----- | 360    | crs. co. s.                 |
| 3858             | 89   | Oct. 14  | Ngaruae Pass, Fakarava Atoll, S. 28°, E. 1 m.       |           | 80    | ----- | 599    | crs. co. s.                 |
| 3859             | 90   | Oct. 14  | Ngaruae Pass, Fakarava Atoll, S. 35°, E. 3.5 m.     |           | 80    | ----- | 666    | pter. oz. vol. part.        |
| 3860             | 91   | Oct. 14  | Southwest end Fakarava, NE. 2 m.                    |           | 80    | ----- | 602    | co. s. pter. oz.            |
| 3861             | 92   | Oct. 14  | 16 44 00  | 145 35 00 | 80    | ----- | 839    | fne. co. s. mang.           |
| 3862             | 93   | Oct. 14  | 16 51 00  | 143 42 00 | 80    | ----- | 1,300  | yl. glob. oz.               |
| 3863             | 94   | Oct. 14  | 16 57 00  | 145 49 00 | 79    | ----- | 1,531  | fne. vol. m. glob.          |
| 3864             | 95   | Oct. 15  | 17 09 00  | 146 00 00 | 78    | 36.1  | 1,079  | lt. yl. glob. oz.           |
| 3865             | 96   | Oct. 15  | 17 14 30  | 145 49 00 | 77    | 39.7  | 527    | co. s. mang.                |
| 3866             | 97   | Oct. 15  | 17 17 00  | 145 45 30 | 79    | ----- | 804    | glob. oz. mang.             |
| 3867             | 98   | Oct. 15  | Northwest point Anaa Atoll, E. 5 m.                 |           | 79    | ----- | 642    | pter. oz. mang. nods.       |
| 3868             | 99   | Oct. 15  | Northwest face Anaa Atoll, S. 1.3 m.                |           | 79    | 39    | 568    | crs. co. s. mang. globs.    |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Nos.                    |      | Date.   | Position.                     |          | Temp. |       | Depth. | Character of bottom.           |
|-------------------------|------|---------|-------------------------------|----------|-------|-------|--------|--------------------------------|
| Ser.                    | A.A. |         | Lat. S.                       | Long. W. | Surf. | Bot.  |        |                                |
| <i>Paumotu Islands.</i> |      |         |                               |          |       |       |        |                                |
|                         |      | 1899.   | ° ' "   ° ' "                 |          | ° F.  | ° F.  | Fms.   |                                |
| 3869                    | 100  | Oct. 15 | North entrance                |          | 80    | ----- | 225    | wh. co. s.                     |
|                         |      |         | Anaa Lagoon, S.               |          |       |       |        |                                |
|                         |      |         | $\frac{1}{2}$ m.              |          |       |       |        |                                |
| 3870                    | 101  | Oct. 15 | Village, point                |          | 80    | 36.0  | 1,110  | fne. co. s. pter. oz. glob.    |
|                         |      |         | Anaa Atoll, S.                |          |       |       |        |                                |
|                         |      |         | 50°, W. 5 m.                  |          |       |       |        |                                |
| 3871                    | 102  | Oct. 15 | 17 10 00   145 19 00          |          | 82    | 36.0  | 1,679  | lt. gy. glob. oz.              |
| 3872                    | 103  | Oct. 15 | 17 03 00   145 08 30          |          | 82    | 35.1  | 1,733  | glob. oz.                      |
| 3873                    | 104  | Oct. 15 | Southwest point               |          | 81    | ----- | 966    | glob. oz. mang.                |
|                         |      |         | Tahanae, N. 68°,              |          |       |       |        |                                |
|                         |      |         | E. 4 m.                       |          |       |       |        |                                |
| 3874                    | 105  | Oct. 15 | Southwest point               |          | 80    | 38.6  | 654    | co. s. mang.                   |
|                         |      |         | Tahanae, E. 2 m.              |          |       |       |        |                                |
| 3875                    | 106  | Oct. 16 | Southwest point               |          | 80    | ----- | 269    | crs. co. s.                    |
|                         |      |         | Tahanae, about                |          |       |       |        |                                |
|                         |      |         | $\frac{1}{2}$ mile off-shore, |          |       |       |        |                                |
|                         |      |         | NE. 3 m.                      |          |       |       |        |                                |
| 3876                    | 107  | Oct. 16 | North west en-                |          | 80    | ----- | 467    | wh. co. s.                     |
|                         |      |         | trance Makemo                 |          |       |       |        |                                |
|                         |      |         | Lagoon, SE. 1 m.              |          |       |       |        |                                |
| 3877                    | 108  | Oct. 16 | Northwest point               |          | 80    | ----- | 856    | crs. co. s. pter. glob. oz.    |
|                         |      |         | Makemo Atoll,                 |          |       |       |        |                                |
|                         |      |         | S. 4 m.                       |          |       |       |        |                                |
| 3878                    | 109  | Oct. 16 | 16 13 00   143 48 00          |          | 80    | ----- | 987    | glob. pter. vol. parts.        |
| 3879                    | 110  | Oct. 17 | 16 03 00   143 32 30          |          | 80    | 36.3  | 1,084  | gy. yl. glob. oz.              |
| 3880                    | 111  | Oct. 17 | 15 53 00   143 26 00          |          | 80    | 35.2  | 1,805  | gy. yl. glob. oz.              |
| 3881                    | 112  | Oct. 17 | 15 54 00   143 06 00          |          | 80    | 35.4  | 1,568  | glob. oz. mang.                |
| 3882                    | 113  | Oct. 17 | 15 55 00   142 39 00          |          | 80    | ----- | 1,503  | lt. br. glob. oz.              |
| 3883                    | 114  | Oct. 17 | Northwest Pass                |          | 80    | 35.7  | 1,385  | gy. yl. glob. oz. mang. parts. |
|                         |      |         | Raroia, SE. 5 m.              |          |       |       |        |                                |
| 3884                    | 115  | Oct. 17 | Northwest point               |          | 81    | 40.2  | 508    | crs. co. s. pter. oz.          |
|                         |      |         | Raroia, SE. $\frac{1}{2}$ m.  |          |       |       |        |                                |
| 3885                    | 116  | Oct. 18 | Southwest point               |          | 79    | 38.7  | 572    | crs. co. s.                    |
|                         |      |         | Takume Atoll,                 |          |       |       |        |                                |
|                         |      |         | NE. 1.5 m.                    |          |       |       |        |                                |
| 3886                    | 117  | Oct. 18 | Midway between                |          | 79    | 38.0  | 563    | mang. part.                    |
|                         |      |         | Raroia and Ta-                |          |       |       |        |                                |
|                         |      |         | kume atolls.                  |          |       |       |        |                                |
| 3887                    | 118  | Oct. 18 | Southwest point               |          | 80    | 38.2  | 630    | co. s. mang.                   |
|                         |      |         | Raroia Atoll,                 |          |       |       |        |                                |
|                         |      |         | NE. 1 m.                      |          |       |       |        |                                |
| 3888                    | 119  | Oct. 18 | 16 14 00   142 50 00          |          | 80    | 35.5  | 1,516  | glob. oz. mang.                |
|                         |      |         | Southwest face                |          |       |       |        |                                |
| 3889                    | 120  | Oct. 18 | Taenga Atoll, N.              |          | 80    | 36.5  | 928    | glob. pter. oz.                |
|                         |      |         | 67°, E. 3 m.                  |          |       |       |        |                                |
| 3890                    | 121  | Oct. 19 | 16 25 00   143 33 00          |          | 79    | 36.1  | 1,108  | glob. oz. mang.                |
| 3891                    | 122  | Oct. 19 | 16 30 00   143 41 00          |          | 79    | 39.7  | 540    | co. s. pter. oz.               |
| 3892                    | 123  | Oct. 25 | Northeast pass                |          | 80    | 39.0  | 603    | crs. co. s.                    |
|                         |      |         | Makemo, S. 1 m.               |          |       |       |        |                                |
| 3893                    | 124  | Oct. 25 | East point Make-              |          | 79    | 36.0  | 1,221  | glob. mang.                    |
|                         |      |         | mo, N. 78°, W. 11 m.          |          |       |       |        |                                |
| 3894                    | 125  | Oct. 26 | Midway between                |          | 79    | 36.0  | 1,135  | glob. oz.                      |
|                         |      |         | Marutea and Ni-               |          |       |       |        |                                |
|                         |      |         | hiru Ids.                     |          |       |       |        |                                |
| 3895                    | 126  | Oct. 26 | 17 07 00   142 49 00          |          | 79    | 35.9  | 1,235  | glob. mang.                    |
| 3896                    | 127  | Oct. 26 | Tekokoto Atoll,               |          | 79    | 38.4  | 617    | co. s.                         |
|                         |      |         | E. 1 m.                       |          |       |       |        |                                |
| 3897                    | 128  | Oct. 26 | Center Hikueru                |          | 80    | 36.6  | 1,600  | pter. oz. glob.                |
|                         |      |         | Atoll, S. 6 m.                |          |       |       |        |                                |
| 3898                    | 129  | Oct. 27 | Northwest point               |          | 80    | 43.8  | 348    | co. s. brk. sh.                |
|                         |      |         | Hikueru Atoll,                |          |       |       |        |                                |
|                         |      |         | E. $\frac{1}{2}$ m.           |          |       |       |        |                                |
| 3899                    | 130  | Oct. 27 | Northwest point               |          | 80    | 37.8  | 798    | co. s. pter. oz.               |
|                         |      |         | Hikueru Atoll,                |          |       |       |        |                                |
|                         |      |         | E. 1.3 m.                     |          |       |       |        |                                |
| 3900                    | 131  | Oct. 28 | Midway between                |          | 79    | 35.7  | 1,372  | glob. oz.                      |
|                         |      |         | Hikueru and                   |          |       |       |        |                                |
|                         |      |         | Marokau.                      |          |       |       |        |                                |
| 3901                    | 132  | Oct. 28 | Northwest point.              |          | 77    | 35.6  | 1,620  | glob. oz. mang.                |
|                         |      |         | Marokau, E. 8 m               |          |       |       |        |                                |
| 3902                    | 135  | Oct. 28 | Pass between Ma-              |          | 79    | 48.1  | 278    | fne. co. s. mang. glob.        |
|                         |      |         | rokau and Rava-               |          |       |       |        |                                |
|                         |      |         | here.                         |          |       |       |        |                                |
| 3903                    | 136  | Oct. 28 | 18 08 00   141 49 00          |          | 79    | 35.2  | 2,187  | vol. m. glob.                  |
| 3904                    | 137  | Oct. 29 | 18 07 00   141 26 00          |          | 78    | ----- | 1,713  | glob. oz.                      |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Nos.                                |      | Date.   | Position.   |           | Temp. |       | Depth. | Character of bottom.          |
|-------------------------------------|------|---------|---|-----------|-------|-------|--------|-------------------------------|
| Ser.                                | A.A. |         | Lat. S.   | Long. W.  | Surf. | Bot.  |        |                               |
| <i>Paumotu and Society Islands.</i> |      |         |   |           |       |       |        |                               |
|                                     |      | 1899.   | ° ' "   | ° ' "     | ° F.  | ° F.  | Fms.   |                               |
| 3905                                | 138  | Oct. 29 | Northwest point Hao Atoll, SE. $\frac{1}{2}$ m.                       |           | 79    | 42.0  | 425    | crs. co. s.                   |
| 3906                                | 140  | Oct. 29 | 18 27 00  | 140 21 00 | 77    | 35.1  | 2,042  | fne. co. s. glob.             |
| 3907                                | 141  | Oct. 30 | 18 29 00  | 139 53 00 | 78    | 35.0  | 1,490  | glob. mang.                   |
| 3908                                | 142  | Oct. 30 | 18 30 00  | 139 30 00 | 78    | 35.1  | 2,103  | fne. vol. m. glob.            |
| 3909                                | 143  | Oct. 30 | Aki Aki Atoll, E. 5 m.  |           | 78    | 35.6  | 1,364  | glob. mang.                   |
| 3910                                | 144  | Oct. 30 | Southwest point Aki Aki, E. 1 m.                                      |           | 79    | 43.0  | 377    | co. s.                        |
| 3911                                | 145  | Oct. 30 | Aki Aki Atoll, N. 5 m.  |           | 78    | 35.0  | 1,725  | crs. co. s.                   |
| 3912                                | 146  | Oct. 31 | 18 56 00  | 139 05 00 | 78    | 35.1  | 2,343  | red c.                        |
| 3913                                | 147  | Oct. 31 | Northeast end Nukutavake, E. 6 m.                                     |           | 78    | 35.2  | 1,688  | mang. glob                    |
| 3914                                | 148  | Oct. 31 | Northeast point Nukutavake, S. 1 m.                                   |           | 78    | 38.9  | 636    | co. s.                        |
| 3915                                | 149  | Oct. 31 | Pinaki Atoll, SE. 3.5 m.  |           | 78    | 37.0  | 860    | glob. mang.                   |
| 3916                                | 150  | Oct. 31 | Pinaki Atoll, E. 1 m.   |           | 79    | 41.0  | 486    | crs. co. s. pter. oz.         |
| 3917                                | 151  | Oct. 31 | Pinaki Atoll, N. 68°, E. 5 m.   |           | 79    | 35.0  | 1,907  | glob. oz. vol. m.             |
| 3918                                | 152  | Oct. 31 | 19 35 00  | 139 13 00 | 78    | 35.1  | 2,335  | red c. glob.                  |
| 3919                                | 153  | Nov. 1  | 19 45 30  | 139 54 00 | 77    | 35.4  | 1,494  | glob. mang.                   |
| 3920                                | 154  | Nov. 1  | 19 52 00  | 140 16 00 | 77    | 35.0  | 2,284  | red c. glob.                  |
| 3921                                | 155  | Nov. 1  | 20 07 00  | 141 00 00 | 78    | 35.0  | 2,391  | mang.                         |
| 3922                                | 156  | Nov. 2  | 20 31 00  | 142 00 00 | 77    | 35.0  | 2,467  | no spec.                      |
| 3923                                | 157  | Nov. 2  | Nukutipipi Atoll, NW. 5 m.  |           | 78    | 35.0  | 2,315  | red c. glob.                  |
| 3924                                | 158  | Nov. 2  | Nukutipipi Atoll, NW. 1 m.  |           | 77    | 39.0  | 649    | co. s. brk. sh.               |
| 3925                                | 159  | Nov. 2  | Nukutipipi Atoll, S. 68°, E. 1 m.                                     |           | 77    | ----- | 736    | co. s. brk. sh.               |
| 3926                                | 160  | Nov. 2  | Midway between Nukutipipi and Anu Anurunga.                           |           | 78    | 35.5  | 1,609  | co. s. mang. glob.            |
| 3927                                | 161  | Nov. 2  | Anu Anurunga, W. 1 m.   |           | 78    | 39.0  | 574    | crs. co. s. mang. pter. oz.   |
| 3928                                | 162  | Nov. 2  | Anu Anurunga, SE. 1 m.  |           | 78    | 38.5  | 659    | co. s. brk. sh. pter. oz.     |
| 3929                                | 163  | Nov. 2  | Midway between Anu Anurunga and Anu Anuraro.                          |           | 78    | 35.2  | 1,890  | glob. oz.                     |
| 3930                                | 164  | Nov. 2  | Anu Anuraro Atoll, NW. $\frac{1}{2}$ m.                               |           | 78    | 40.7  | 438    | co. s.                        |
| 3931                                | 165  | Nov. 2  | Anu Anuraro Atoll, SE. $\frac{1}{2}$ m.                               |           | 77    | 42.5  | 405    | co. s. pter. oz. mang. part.  |
| 3932                                | 166  | Nov. 2  | 20 15 00  | 144 00 00 | 77    | 34.8  | 2,265  | red c. mang.                  |
| 3933                                | 167  | Nov. 3  | 20 02 00  | 144 28 00 | 78    | 34.9  | 2,524  | sft. red c.                   |
| 3934                                | 168  | Nov. 3  | Hereheretue Atoll, W. 6 m.  |           | 77    | 35.0  | 1,719  | glob. oz.                     |
| 3935                                | 169  | Nov. 3  | Hereheretue Atoll, W. 1 m.  |           | 78    | 39.5  | 594    | crs. co. s.                   |
| 3936                                | 170  | Nov. 3  | Hereheretue Atoll, E. 0.3 m.  |           | 78    | 62.1  | 189    | co. s. mang. part.            |
| 3937                                | 171  | Nov. 3  | Hereheretue Atoll, SE. 5.3 m.   |           | 78    | 35.3  | 1,688  | lt. br. glob. oz. mang. part. |
| 3938                                | 172  | Nov. 3  | 19 22 00  | 145 47 00 | 77    | 35.0  | 2,322  | vol. m. glob.                 |
| 3939                                | 174  | Nov. 3  | 18 28 00  | 147 11 00 | 79    | 35.0  | 2,087  | mang. nods.                   |
| 3940                                | 175  | Nov. 5  | South end Mehetia Island, NW. 14 m.                                   |           | 78    | 34.8  | 2,129  | vol. m.                       |
| 3941                                | 176  | -----   | Southeast point Mehetia Island, NW. 1.25 m.                           |           | 80    | 38.1  | 832    | vol. co. s.                   |
| 3942                                | 177  | -----   | Northwest point Mehetia Island, S. $\frac{1}{2}$ m.                   |           | 80    | 69.0  | 142    | vol. r. crs. co. s.           |
| 3943                                | 178  | -----   | 17 46 00  | 148 23 00 | 81    | 34.9  | 2,111  | vol. s.                       |
| 3944                                | 179  | -----   | 17 35 00  | 148 48 00 | 80    | 35.0  | 1,755  | br. vol. s.                   |
| 3945                                | 180  | -----   | Northeast point Murea Island, SW. 5 m.                                |           | 79    | 36.7  | 981    | crs. vol. s. pter.            |
| 3946                                | 181  | -----   | 18 54 00  | 162 31 00 | 79    | 34.7  | 2,498  | no spec.                      |
| <i>Cook to Marshall Islands.</i>    |      |         |   |           |       |       |        |                               |
| 3947                                | 182  | -----   | 18 59 00  | 164 47 00 | 82    | 33.4  | 2,882  | red c. glob.                  |
| 3948                                | 184  | -----   | 20 15 00  | 172 00 00 | 80    | 34.0  | 3,141  | red c.                        |
| 3949                                | 186  | -----   | 21 18 00  | 173 51 00 | 77    | 34.2  | 4,540  | lt. br. vol. m.               |
| 3950                                | 187  | Dec. 4  | Fatumanga Isl., Vavau Group Tonga, E. 4 m.                            |           | 79    | ----- | 682    | co. s. glob. pter. oz.        |
| 3951                                | 188  | Dec. 6  | 18 43 00  | 175 28 00 | 79    | 36.2  | 1,381  | vol. m. glob. oz.             |
| 3952                                | 189  | Dec. 7  | Equidistant from Mothe, Nomuka, and Yangasa Islands, Lau Group, Fiji. |           | 79    | 42.9  | 453    | co. s. glob. pter. oz.        |

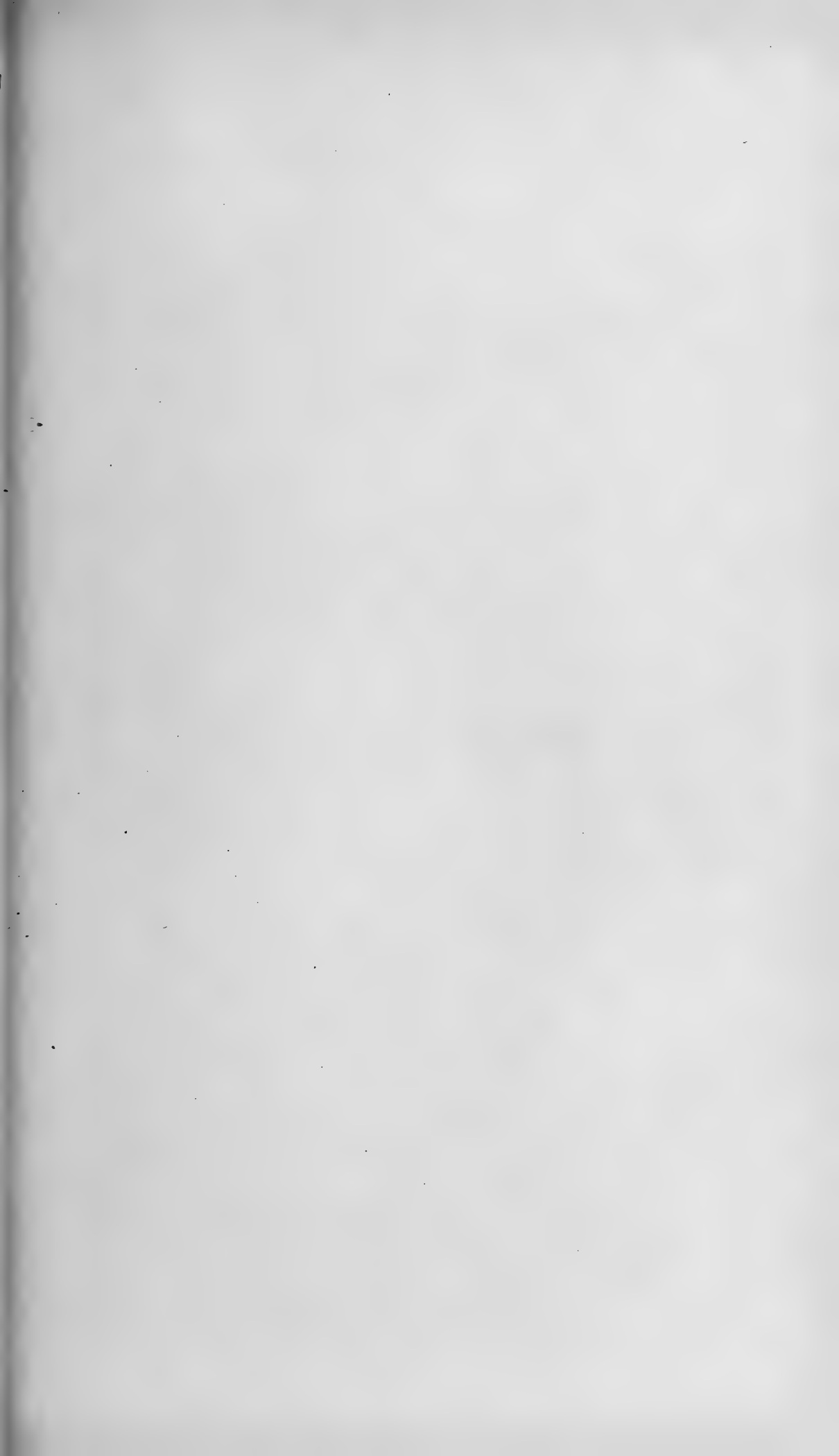
*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Nos.                         |      | Date.   | Position.   |           | Temp. |       | Depth.         | Character of bottom.     |
|------------------------------|------|---------|---|-----------|-------|-------|----------------|--------------------------|
| Ser.                         | A.A. |         | Lat. S.   | Long. W.  | Surf. | Bot.  |                |                          |
| Cook to Marshall Islands.    |      |         |   |           |       |       |                |                          |
|                              |      | 1899.   | ° ' "   ° ' "   | ° F.      | ° F.  | Fms.  |                |                          |
| 3953                         | 190  | Dec. 7  | Between reefs of Yangasa and Nomuka groups.   |           | 79    | 47.0  | 324            | co. s. mang.             |
| 3954                         | 191  | Dec. 7  | West end Nomuka Isl., N 33°, E. 6 m.  |           | 79    | 39.2  | 600            | co. s. pum. pter. oz.    |
| 3955                         | 192  | Dec. 7  | Marengo Island, S. 2.7 m.   |           | 79    | 42.4  | 450            | co. s. mang. pter. glob. |
| 3956                         | 193  | Dec. 9  | 18 56 30  | 179 16 00 | 80    | 37.0  | 990            | fne. co. s. oz.          |
|                              |      |         | Long. E.  |           |       |       |                |                          |
| 3957                         | 195  | Dec. 22 | South point Nurakita Island, N. ½ m.  |           | 86    | ----- | 245            | co.                      |
| 3958                         | 196  | Dec. 23 | Village, south coast Apamama Island, N. ½ m.  |           | 88    | ----- | Did not sound. |                          |
| 1900.                        |      |         |   |           |       |       |                |                          |
|                              |      |         | Lat. N.   |           |       |       |                |                          |
| 3959                         | 197  | Jan. 2  | Abatiku Isl., Apamama Atoll, S. 63°, E. 16 m.   |           | 83    | 35.0  | 2,221          | lt. gy. glob. oz.        |
| 3960                         | 198  | Jan. 2  | South point Maiana Atoll, N. 55°, W. 9 m.   |           | 84    | 35.6  | 1,365          | lge. yl. glob. oz.       |
| 3961                         | 199  | Jan. 2  | Center south coast Tarawa, N. 10 m.   |           | 84    | 43.5  | 413            | crs. br. glob. oz.       |
| 3962                         | 200  | Jan. 2  | Center south coast Tarawa, N. ½ m.  |           | 84    | ----- | 99             | co.                      |
| 3963                         | 201  | Jan. 2  | South coast Tarawa, sta. No. 3963, N. ½ m., W. 1 m.   |           | 84    | ----- | 208            | co.                      |
| 3964                         | 202  | Jan. 3  | Southeast point Tarawa, N. 12°, W. 5 m.   |           | 84    | 35.3  | 1,569          | glob. oz.                |
| 3965                         | 203  | Jan. 4  | Apaiang Atoll, in line with north point Tarawa, N. 2 m.                                     |           | 84    | 51.3  | 170            | gy. glob. oz.            |
| 3966                         | 204  | Jan. 4  | 1 52 00   | 173 15 00 | 84    | 34.9  | 2,156          | gy. glob. oz.            |
| 3967                         | 205  | Jan. 4  | Monument, west shore Maraki Atoll, S. 56°, E. ½ m.  |           | 83    | ----- | 431            | no spec.                 |
| 3968                         | 206  | Jan. 5  | 2 27 00   | 173 09 00 | 83    | 34.8  | 2,255          | glob. oz.                |
| 3969                         | 207  | Jan. 5  | 2 49 00   | 173 01 00 | 83    | 35.3  | 1,461          | glob. oz.                |
| 3970                         | 208  | Jan. 7  | 3 57 00   | 172 00 00 | 83    | 34.7  | 2,486          | lt. yl. glob.            |
| 3971                         | 209  | Jan. 8  | 4 25 00   | 171 13 00 | 83    | 34.7  | 2,505          | lt. gy. glob. oz.        |
| 3972                         | 210  | Jan. 8  | 4 54 00   | 170 21 00 | 83    | 34.7  | 2,444          | glob. oz.                |
| 3973                         | 211  | Jan. 9  | 5 20 00   | 169 43 00 | 83    | 34.8  | 2,411          | glob. oz.                |
| 3974                         | 212  | Jan. 9  | South point Jaluit Atoll, N. 14°, E. 5 m.   |           | 82    | 35.0  | 1,937          | crs. gy. glob. oz.       |
| 3975                         | 213  | Jan. 14 | 6 34 00   | 169 13 00 | 83    | 35.0  | 2,613          | glob. oz. m.             |
| 3976                         | 214  | Jan. 15 | Southeast point Elmore Atoll, N. 30°, W. 14 m.  |           | 82    | 35.0  | 2,136          | crs. glob. oz.           |
| 3977                         | 215  | Jan. 15 | Southeast point Elmore Atoll, N. 30°, W. 9 m.   |           | 82    | 35.9  | 1,283          | crs. glob. oz.           |
| 3978                         | 216  | Jan. 15 | Wotju Island, Elmore Atoll, SE. 6 m.  |           | 82    | 36.5  | 1,068          | co. s.                   |
| 3979                         | 217  | Jan. 15 | Midway between Wotju Island, Elmore Atoll, and Leuen Island, Namu Atoll, 12 m. from latter. |           | 82    | 37.0  | 906            | crs. glob. cz.           |
| Marshall to Ladrone Islands. |      |         |   |           |       |       |                |                          |
| 3980                         | 218  | Jan. 15 | South point Leuen Isl., Namu, N. 2 m.   |           | 83    | 39.7  | 630            | crs. co. s.              |
| 3981                         | 219  | Jan. 15 | 8 02 00   | 167 43 00 | 82    | 35.0  | 2,179          | glob. m.                 |
| 3982                         | 220  | Jan. 16 | South point Kwajalong Atoll, NE. 12 m.  |           | 82    | 35.0  | 1,897          | glob. m.                 |
| 3983                         | 221  | Jan. 18 | Entrance South Pass, Rongelab, N. ½ m.  |           | 80    | 43.4  | 400            | co. s.                   |
| 3984                         | 222  | Jan. 18 | Entrance South Pass, Rongelab, N. 1½ m.   |           | 81    | 39.0  | 746            | crs. co. s.              |
| 3985                         | 223  | Jan. 18 | 10 49 00  | 167 15 00 | 80    | 35.0  | 2,469          | glob. oz.                |
| 3986                         | 224  | Jan. 19 | 10 30 00  | 167 42 00 | 80    | 35.0  | 2,586          | glob. oz. vol. part.     |
| 3987                         | 225  | Jan. 20 | 10 15 00  | 168 06 00 | 81    | 34.9  | 2,609          | vol. m. glob.            |
| 3988                         | 226  | Jan. 20 | Kapenor Island, Likiep, N. 63°, E. 8 m.   |           | 80    | 34.9  | 2,231          | wh. glob. m.             |
| 3989                         | 227  | Jan. 21 | S. Pass, Likiep, N. ½ m.  |           | 81    | 42.6  | 468            | crs. co. s.              |
| 3990                         | 228  | Jan. 21 | S. Pass, Likiep, N. 1½ m.   |           | 81    | 36.9  | 933            | crs. co. s.              |
| 3991                         | 229  | Jan. 21 | 9 40 00   | 169 32 00 | 81    | 35.5  | 1,583          | glob. oz.                |
| 3992                         | 230  | Jan. 23 | Schismarev Pass, Wotje, N. 1 m.   |           | 81    | 41.7  | 482            | co. s.                   |

*Record of hydrographic soundings of the Albatross, etc.—Continued.*

| Nos.   |      | Date.   | Position.                            |           | Temp. |       | Depth. | Character of bottom.     |
|--|------|---------|--------------------------------------|-----------|-------|-------|--------|--------------------------|
| Ser.   | A.A. |         | Lat. N.                              | Long. E.  | Surf. | Bot.  |        |                          |
| Marshall to Ladrone Islands.                             |      |         |                                      |           |       |       |        |                          |
| 1900.  |      |         |                                      |           |       |       |        |                          |
| 3993   | 231  | Jan. 23 | Schischmarev                         | Pass,     | 81    | 36.1  | 1,187  | co. s. mang.             |
|  |      |         | Wotje, N. 3 m.                       |           |       |       |        |                          |
| 3994   | 232  | Jan. 23 | 8 50 00                              | 170 26 00 | 81    | 34.9  | 2,221  | glob. oz.                |
| 3995   | 233  | Jan. 24 | 7 54 00                              | 170 56 00 | 81    | 36.5  | 1,009  | crs. glob. oz.           |
| 3996   | 234  | Jan. 24 | North point                          | Arhno     | 81    | 36.0  | 1,325  | crs. glob. oz.           |
|  |      |         | Atoll, S. 50°, E. 7 m.               |           |       |       |        |                          |
| 3997   | 235  | Jan. 28 | Southwest point                      | Arhno     | 82    | 36.0  | 1,253  | glob. oz.                |
|  |      |         | Atoll, NE. 6 m.                      |           |       |       |        |                          |
| 3998   | 236  | Jan. 28 | 6 34 00                              | 170 59 00 | 81    | 34.9  | 2,482  | glob. m.                 |
| 3999   | 237  | Jan. 29 | 6 11 00                              | 170 25 00 | 81    | 34.7  | 2,486  | glob. m.                 |
| 4000   | 238  | Feb. 5  | 5 48 00                              | 169 01 00 | 82    | 35.0  | 2,424  | glob. oz.                |
| 4001   | 239  | Feb. 9  | Entrance Port                        | Lottin,   | 82    | 43.5  | 371    | vol. co. s.              |
|  |      |         | Kusaie, N. 4 m.                      |           |       |       |        |                          |
| 4002   | 240  | Feb. 13 | 6 49 00                              | 156 36 00 | 82    | 34.9  | 2,475  | glob. oz. vol. m.        |
| 4003   | 241  | Feb. 13 | 6 51 00                              | 154 39 00 | 81    | 35.0  | 2,533  | glob. m. vol. part.      |
| 4004   | 242  | Feb. 14 | 6 55 00                              | 152 40 00 | 82    | 41.5  | 525    | crs. co. s.              |
| 4005   | 243  | Feb. 15 | South Island, Royalist               |           | 82    | 35.0  | 2,162  | gy. glob. m. vol. parts. |
|  |      |         | Cluster Truk Group,                  |           |       |       |        |                          |
|  |      |         | NW. 17 m.                            |           |       |       |        |                          |
| 4006   | 244  | Feb. 17 | 8 06 00                              | 151 08 00 | 81    | 35.0  | 2,205  | glob. m.                 |
| 4007   | 245  | Feb. 18 | 9 31 00                              | 149 36 00 | 81    | 35.0  | 2,735  | red c.                   |
| 4008   | 246  | Feb. 19 | 10 34 00                             | 148 25 00 | 81    | 35.0  | 2,993  | red c. mang.             |
| 4009   | 247  | Feb. 20 | 11 35 00                             | 147 15 00 | 80    | 35.0  | 3,213  | red c. mang. pum.        |
| 4010   | 248  | Feb. 20 | 12 51 00                             | 145 46 00 | 81    | 35.8  | 4,813  | red c. mang. pum.        |
| 4011   | 249  | Feb. 21 | 13 08 00                             | 145 25 00 | 80    | 35.0  | 2,337  | vol. s.                  |
| East Coast Honshu Island, Japan.                         |      |         |                                      |           |       |       |        |                          |
| 4012   | ---- | June 2  | Inuboe Saki Light, S.                |           | 72    | ----- | 1,371  | vol. s. part.            |
|  |      |         | 77°, W. 47 m.                        |           |       |       |        |                          |
| 4013   | ---- | June 3  | Inuboe Saki Light, S                 |           | 72    | ----- | 1,759  | vol. s. part.            |
|  |      |         | 74°, W. 76 m.                        |           |       |       |        |                          |
| 4014   | ---- | June 3  | Inuboe Saki Light, S.                |           | 75    | ----- | 3,800  | vol. s. part.            |
|  |      |         | 73°, W. 96 m.                        |           |       |       |        |                          |
| 4015   | ---- | June 3  | Inuboe Saki Light, S.                |           | 75    | 35.2  | 4,300  | no spec.                 |
|  |      |         | 72°, W. 118 m.                       |           |       |       |        |                          |
| 4016   | ---- | June 3  | Shioya Saki Light, N.                |           | 66    | 35.1  | 2,976  | no spec.                 |
|  |      |         | 73°, W. 74 m.                        |           |       |       |        |                          |
| East of Kuril Islands, North Pacific.                    |      |         |                                      |           |       |       |        |                          |
| 4017   | ---- | June 16 | Cape Rollin, N. 67°, W.              |           | 36    | ----- | 528    | vol. s. fine g.          |
|  |      |         | 21 m.                                |           |       |       |        |                          |
| Cape Tschipunski, Kamchatka, eastward across Bering Sea. |      |         |                                      |           |       |       |        |                          |
| 4018   | ---- | June 23 | Cape Tschipunski, N.                 |           | 47    | 35.2  | 87     | bk. vol. s. fine g. co.  |
|  |      |         | 33°, W. 9 m.                         |           |       |       |        |                          |
| 4019   | ---- | June 24 | Cape Kosloff, N. } each              |           | 45    | 35    | 2,991  | gn. m. vol. s.           |
|  |      |         | 15° W. } about                       |           |       |       |        |                          |
|  |      |         | Cape Taschipunski, S. 82°, W. } 72   |           |       |       |        |                          |
|  |      |         | S. E. end Bering Id., N. E. } miles. |           |       |       |        |                          |
| 4020   | ---- | June 24 | Cape Kronotski, } each               |           | 47    | 35    | 1,804  | gy. vol. s.              |
|  |      |         | N. W. } about                        |           |       |       |        |                          |
|  |      |         | 108                                  |           |       |       |        |                          |
|  |      |         | miles.                               |           |       |       |        |                          |
| 4021   | ---- | June 26 | W. end Attu Id., S. 90 m.            |           | 45    | 35    | 2,166  | fine y. l. vol. s.       |
|  |      |         | appx.                                |           |       |       |        |                          |
| 4022   | ---- | June 27 | 54 31 00                             | 179 21 00 | 45    | 38    | 282    | gn. m. fine vol. s.      |
| 4023   | ---- | June 27 | 54 31 00                             | 179 30 00 | 45    | 37    | 636    | gn. m. vol. s. wh. sp.   |
| 4024   | ---- | June 27 | 54 24 20                             | 179 24 00 | 45    | 37.7  | 454    | gn. m. fine vol. s.      |
| 4025   | ---- | June 27 | 54 18 00                             | 179 14 00 | 45    | 37.2  | 536    | gy. m. fine vol. s.      |
| 4026   | ---- | June 27 | 54 14 00                             | 179 08 00 | 45    | ----- | 897    | no spec.                 |
| 4027   | ---- | June 27 | 54 22 00                             | 179 08 00 | 45    | ----- | 708    | gy. s.                   |
| 4028   | ---- | June 27 | 54 40 00                             | 179 08 00 | 45    | ----- | 310    | gy. vol. s. wh. sp.      |
| 4029   | ---- | June 27 | 54 47 20                             | 179 08 00 | 45    | ----- | 913    | gy. s. c.                |
| 4030   | ---- | June 27 | 54 47 20                             | 179 25 00 | 45    | ----- | 1,279  | gy. s.                   |
| 4031   | ---- | June 27 | 54 47 20                             | 179 54 00 | 45    | ----- | 2,111  | bn. m. bk. s.            |
|  |      |         | Long. W.                             |           |       |       |        |                          |
| 4032   | ---- | June 27 | 54 50 00                             | 177 11 00 | 46    | 35    | 2,086  | vol. m.                  |

a Deepest sounding by the *Albatross*.







THE ALBATROSS, WITH SURFACE AND DIP NETS IN USE.

| Serial No. | Equiv-<br>alent<br>dredg-<br>ing sta-<br>tion. | Time.      |                      | Instrument used.             | Position.                                    |          | Sky.             | Sea.         | Temperature. |             |                        | Barome-<br>ter. |
|------------|--|------------|----------------------|------------------------------|--|----------|------------------|--------------|--------------|-------------|------------------------|-----------------|
|            |  | Out.       | In.                  |                              | Lat. N.                                      | Long. W. |                  |              | Air<br>dry.  | Air<br>wet. | Sur-<br>face<br>water. |                 |
| 1887.      |  |            |                      |                              |  |          |                  |              |              |             |                        |                 |
| Sur. 1     | Nov. 22  | 4.15 p.m.  | 5.00 p.m.            | 3-foot net.                  | 84 13 00                                     | 74 13 30 | Clear.           | Smooth.      | 64           | 61          | 75                     | 30.38           |
| 2          | Nov. 23  | 5.00 p.m.  | 6.15 p.m.            | do                           | 31 16 00                                     | 71 50 00 | Slightly cloudy. | do           | 68           | 65          | 70                     | 30.30           |
| 3          | Nov. 27  | 6.52 p.m.  | 8.25 p.m.            | do                           | 18 40 00                                     | 63 30 00 | Cloudy and rainy | Rough.       | 81           | 80          | 80                     | 29.84           |
| 4          | Nov. 28  | 10.00 a.m. | 11.19 p.m.           | do                           | 16 54 00                                     | 63 12 00 | Clear.           | Smooth.      | 82           | 80          | 81                     | 29.92           |
| 5          | Dec. 4   | 12.15 p.m. | 2.01 p.m.            | do                           | 13 34 00                                     | 61 04 00 | Part overcast.   | do           | 82           | 80          | 82                     | 29.88           |
| 6          | Dec. 5   | 12.55 p.m. | 2.15 p.m.            | do                           | 11 40 00                                     | 58 33 00 | Slightly cloudy. | do           | 85           | 83          | 83                     | 29.84           |
| 7          | Dec. 7   | 12.50 p.m. | 1.45 p.m.            | do                           | 8 04 00                                      | 52 47 00 | Showery.         | do           | 83           | 82          | 81                     | 29.88           |
| Lat. S.    |  |            |                      |                              |  |          |                  |              |              |             |                        |                 |
| 8          | Dec. 14  | 10.40 a.m. | 11.30 a.m.           | do                           | 3 22 00                                      | 37 49 00 | Light clouds.    | Rough.       | 80           | 79          | 79                     | 29.86           |
| 9          | Dec. 18  | 4.15 p.m.  | 5.30 p.m.            | do                           | 12 07 00                                     | 37 17 00 | Clear.           | Smooth.      | 84           | 81          | 80                     | 29.96           |
| 10         | Dec. 26  | 12.45 p.m. | 2.30 p.m.            | do                           | 15 39 00                                     | 38 32 54 | Light clouds.    | Light swell. | 82           | 80          | 79                     | 30.00           |
| 11         | Dec. 30  | 6.45 a.m.  | 6.55 a.m.            | do                           | 23 08 00                                     | 41 34 00 | do               | Smooth.      | 76           | 76          | 70                     | 29.88           |
| 1888.      |  |            |                      |                              |  |          |                  |              |              |             |                        |                 |
| 12         | Jan. 15  | 11.40 a.m. | 12.10 p.m.           | do                           | 45 22 00                                     | 64 20 00 | Overcast.        | do           | 60           | 58          | 58                     | 30.02           |
| 13         | Jan. 16  | 11.45 a.m. | 12.05 p.m.           | do                           | 48 37 00                                     | 65 46 00 | Light clouds.    | Very smooth. | 58           | 55          | 52                     | 29.92           |
| 14         | Jan. 17  | 11.45 a.m. | 11.55 a.m.           | do                           | 51 34 23                                     | 68 00 00 | Clear.           | Smooth.      | 49           | 46          | 50                     | 30.14           |
| 15         | Feb. 24  | 8.05 a.m.  | 8.25 p.m.            | 2 Tanner combination nets.   | 22 54 00                                     | 77 10 00 | Moonlight.       | Very smooth. | 74           | 71          | 76                     | 29.90           |
| 16         | Mar. 1   | 4.31 a.m.  | 4.45 a.m.            | do                           | 4 21 00                                      | 81 59 00 | do               | do           | 73           | 73          | 74                     | 29.80           |
| 17         | Mar. 2   | 3.25 p.m.  | 4.15 p.m.            | Tanner combination           | 00 37 00                                     | 81 00 00 | Overcast.        | do           | 80           | 78          | 77                     | 29.74           |
| Lat. N.    |  |            |                      |                              |  |          |                  |              |              |             |                        |                 |
| 18         | Mar. 3   | 6.40 a.m.  | 8.20 a.m.            | do                           | 1 3 00                                       | 80 15 00 | do               | Smooth.      | 78           | 76          | 78                     | 29.84           |
| 19         | Mar. 5   | 1.55 p.m.  | 2.15 p.m.            | do                           | 7 37 00                                      | 78 46 30 | Hazy.            | Light swell. | 79           | 77          | 78                     | 29.76           |
| 20         | Mar. 5   | 4.25 p.m.  | 4.45 p.m.            | do                           | 7 57 00                                      | 78 55 00 | Light clouds.    | Very smooth. | 79           | 77          | 78                     | 29.74           |
| 21         | Mar. 5   | 5.54 p.m.  | 6.15 p.m.            | do                           | 8 5 00                                       | 78 51 00 | Hazy sundown.    | do           | 79           | 77          | 78                     | 29.74           |
| 22         | Mar. 5   | 7.15 p.m.  | 10.25 p.m.           | do                           | At anchor off Perlas Isds. Gulf of Panama.   |          | Starlight.       | do           | 77           | 76          | 77                     | 29.76           |
| 23         | Mar. 6   | 11.15 a.m. | 11.35 a.m.           | Tanner combination           | 8 44 00                                      | 79 09 00 | Overcast.        | do           | 77           | 76          | 75                     | 29.90           |
| 24         | Mar. 31  | 7.00 p.m.  | 7.30 p.m.            | do                           | 6 44 00                                      | 80 27 00 | Clear starlight. | Light swell. | 82           | 80          | 81                     | 29.80           |
| 25         | Apr. 1   | 8.45 p.m.  | 12.00 mid-<br>night. | Scoop nets; electric lights. | 4 18 00                                      | 85 14 00 | do               | Very smooth. | 84           | 83          | 83                     | 29.80           |
| 26         | Apr. 3   | 5.00 p.m.  | 7.35 p.m.            | Tanner combination           | 00 30 00                                     | 88 37 30 | Light clouds.    | Light swell. | 84           | 82          | 80                     | 29.68           |
| Lat. S.    |  |            |                      |                              |  |          |                  |              |              |             |                        |                 |
| 27         | Apr. 4   | 5.31 a.m.  | 7.48 a.m.            | do                           | 00 24 00                                     | 89 06 00 | Very cloudy.     | Smooth.      | 79           | 79          | 79                     | 29.74           |
| 28         | Apr. 7   | 8.00 p.m.  | 9.00 p.m.            | Scoop nets, electric light.  | Off Hood Island, Gala-<br>pagos Archipelago. |          | Clear starlight. | do           | 82           | 81          | 80                     | 29.80           |
| 29         | Apr. 15  | 9.45 a.m.  | 10.45 a.m.           | Tanner combination           | 00 46 00                                     | 89 42 00 | Light clouds.    | Very smooth. | 85           | 83          | 81                     | 29.80           |
| 30         | Apr. 15  | 1.30 p.m.  | 2.20 p.m.            | do                           | 00 29 00                                     | 89 54 30 | do               | do           | 85           | 83          | 83                     | 29.74           |
| 31         | Apr. 15  | 6.30 p.m.  | 7.30 p.m.            | do                           | 00 08 00                                     | 90 06 00 | do               | Smooth.      | 82           | 82          | 82                     | 29.72           |

## Record of Tanner intermediate tow-net stations of the Albatross, 1891.

[Region from Panama and Galapagos Islands to Gulf of California.]

| Serial No. | Date.   | Time.       | Position.           |           | Temperature. |           | Character of bottom. | Wind.      |        | Drift.                       |              | Mean depth. | Remarks.   |
|------------|---------|-------------|---------------------|-----------|--------------|-----------|----------------------|------------|--------|------------------------------|--------------|-------------|--|
|            |         |             | Lat. N.             | Long. W.  | Air. face.   | Sur. bot. |                      | Direction. | Force. | Towed at a depth.            | Time towing. |             |  |
|            | 1891.   |             |                     |           |              |           |                      |            |        |                              |              |             |  |
| 3382 Dr    | Mar. 7  | 8.50 a. m.  | 6 21 00             | 80 41 00  | 77           | 75        | gn. m.               | N          | 3      | 200                          | 15           |             | Hauled direct from 200 fathoms in 10 minutes; ship stationary.   |
| 3382 Dr    | Mar. 7  | 9.53 a. m.  | 6 21 00             | 80 41 00  | 77           | 75        | gn. m.               | N          | 3      | 200                          | 15           |             |  |
| 3382 Dr    | Mar. 7  | 10.23 a. m. | 6 21 00             | 80 41 00  | 77           | 75        | gn. m.               | N          | 3      | 100                          | 17           |             |  |
| 3388 Dr    | Mar. 9  | 10.31 a. m. | 7 06 00             | 79 48 00  | 75           | 73        | gn. glob. oz.        | N          | 2      | 400                          | 17           |             | Sounded at 7.06 a. m. in 1,100 fms. Took second trial of net at 9.44 a. m., and finished at 11.56 a. m., having drifted into deeper water, as shown by soundings taken at 12.03 p. m. in 1,482 fms. Greatest amount of wire out while towing, 1,160 fms., the angle equaling depth of 1,000 fms. |
| 2619 Hyd   | Mar. 11 | 8.25 a. m.  | 7 31 00             | 78 42 30  | 72           | 68        | gn. glob. oz.        | N          | 2      | 300                          | 19           |             |  |
| 2619 Hyd   | Mar. 11 | 9.44 a. m.  | 7 31 00             | 78 42 30  | 72           | 68        | gn. glob. oz.        | N          | 2      | 1,000                        | 16           |             |  |
| 2627 Hyd   | Mar. 25 | 6.49 a. m.  | 0 36 00             | 82 45 00  | 80           | 81        | gy. glob. oz.        | WNW        | 1      | { 1,773 }<br>{ 1,739 }       | 20           | 1,756       | Fathoms=mean depth at which towed net. Net was lowered to 1,740 fms. vertically, and veered to 1,800 fathoms at an angle between 10° and 15°, equaling a depth varying between 1,773 and 1,739 fms.  |
| 2628 Hyd   | Mar. 26 | 9.14 a. m.  | Lat. S.<br>0 13 00  | 84 52 00  | 81           | 81        |                      | Calm       | 0      | { 214 }<br>{ 234 }           | 20           | 224         |  |
| 3414 Dr    | Apr. 8  | 6.57 a. m.  | Lat. N.<br>10 14 00 | 96 28 00  | 81           | 82        | gn. m.               | ENE        | 2      | { 85 }<br>{ 105 }<br>{ 195 } | 14           | 95          |  |
| 3414 Dr    | Apr. 8  | 7.47 a. m.  | 10 14 00            | 96 28 00  | 81           | 82        | gn. m.               | ENE        | 2      | { 200 }                      | 10           | 198         | Fathoms=mean depth at which towed net.   |
| 3414 Dr    | Apr. 8  | 8.49 a. m.  | 10 14 00            | 96 28 00  | 81           | 82        | gn. m.               | ENE        | 3      | 300                          | 15           |             |  |
| 3414 Dr    | Apr. 8  | 10.00 a. m. | 10 14 00            | 96 28 00  | 81           | 82        | gn. m.               | ENE        | 3      | 300                          | 15           |             |  |
| 3414 Dr    | Apr. 9  | 10.04 a. m. | 12 34 00            | 97 21 00  | 84           | 82        | gn. m.               | ENE        | 3      | 300                          | 15           |             | No soundings taken; depth estimated approximately as over 2,000 fathoms.   |
| 3414 Dr    | Apr. 9  | 8.03 p. m.  | 13 33 30            | 97 57 30  | 82           | 83        |                      | NNW        | 1      | 175                          | 8            |             |  |
| 3414 Dr    | Apr. 11 | 8.45 a. m.  | 16 32 00            | 99 42 00  | 80           | 80        |                      | Calm       | 0      | 175                          | 10           |             |  |
| 3414 Dr    | Apr. 16 | 10.10 a. m. | 17 39 30            | 102 11 30 | 77           | 76        |                      | WSW        | 2      | 300                          | 10           |             | Net dragged on bottom.   |
| 3436 Dr    | Apr. 22 | 1.22 p. m.  | 27 03 40            | 110 53 40 | 75           | 72        | bn. m. bk. sp.       | W          | 2      | 175                          | 15           |             |  |
| 2637 Hyd   | Apr. 22 | 7.21 p. m.  | 27 20 00            | 110 54 00 | 72           | 71        | bn. m. bk. sp.       | WNW        | 1      | 800                          | 15           |             |  |
| 3437 Dr    | Apr. 23 | 5.31 a. m.  | 27 39 40            | 111 00 30 | 71           | 70        | bn. m. bk. sp.       | WNW        | 1      | 700                          | 15           |             | Do.  |
| 2638 Hyd   | Apr. 23 | 7.26 a. m.  | 27 38 00            | 111 04 00 | 72           | 72        | bn. m. bk. sp.       | E          | 1      | 600                          | 15           |             |  |
|            |         |             |                     |           |              |           |                      | ENE        | 2      | 500                          | 15           |             |  |

## Record of surface tow-net stations of the Albatross, 1891.

[Region from Panama and Galapagos to Gulf of California.]

| Serial No. | Date.   | Time.       | Position.          |           | Temperatures. |              | Depth: | Character of bottom. | Remarks.                               |
|------------|---------|-------------|--------------------|-----------|---------------|--------------|--------|----------------------|--|
|            |         |             | Lat. N.            | Long. W.  | Sur-<br>face. | Bot-<br>tom. |        |                      |  |
|            |         |             | ° ' "              | ° ' "     | ° F.          | ° F.         | Fms.   |                      |  |
| 1891.      |         |             |                    |           |               |              |        |                      |  |
| 3353 Dr    | Feb. 23 | 8.56 a. m.  | 7 06 15            | 80 34 00  | 73            |              | 695    | gn. m.               |  |
| 3354 Dr    | Feb. 23 | 1.25 p. m.  | 7 09 45            | 80 50 00  | 78            |              | 322    | gn. m.               |  |
| 3355 Dr    | Feb. 23 | 7.30 p. m.  | 7 09 30            | 81 08 30  | 83            |              | 546    | sft. bl. m.          | 15 miles from Mariato Point.           |
| 3357 Dr    | Feb. 24 | 6.17 a. m.  | 6 35 00            | 81 44 00  | 83            |              | 782    | Modern greensand     |  |
| 3360 Dr    | Feb. 24 | 5.20 p. m.  | 6 17 00            | 82 05 00  | 83            |              | 1,672  | fne. bk. dk. gn. s.  |  |
| 3361 Dr    | Feb. 25 | 7.33 a. m.  | 6 10 00            | 83 06 00  | 82            |              | 1,471  | gn. oz.              |  |
| 3363 Dr    | Feb. 26 | 4.37 p. m.  | 5 43 00            | 85 50 00  | 83            |              | 978    | wh. glob. oz.        |  |
| 3365 Dr    | Feb. 27 | 1.30 p. m.  | 5 31 00            | 86 31 00  | 85            |              | 1,010  | yl. glob. oz.        |  |
| 3366 Dr    | Feb. 27 | 8.04 p. m.  | 5 30 00            | 86 45 00  | 84            |              | 1,067  | yl. glob. oz.        |  |
| 3368 Dr    | Feb. 28 | 7.21 a. m.  | 5 32 45            | 86 54 30  | 82            |              | 66     | rky.                 |  |
| 3370 Dr    | Feb. 28 | 10.03 a. m. | 5 36 40            | 86 56 50  | 84            |              | 134    | rks. and s.          |  |
| 3372 Dr    | Mar. 1  | 5.51 p. m.  | 4 49 00            | 86 11 20  | 84            |              | 761    | gy. glob. oz.        | At Cocos Island. Surface net at night. |
| 3375 Dr    | Mar. 4  | 6.36 a. m.  | 2 34 00            | 82 29 00  | 77            |              | 1,201  | gy. glob. oz.        | Surface net 8 p. m.                    |
| 3376 Dr    | Mar. 4  | 4.27 p. m.  | 3 09 00            | 82 08 00  | 78            |              | 1,132  | gy. glob. oz.        |  |
| 3382 Dr    | Mar. 7  | 10.46 a. m. | 6 21 00            | 80 41 00  | 75            |              | 1,793  | gn. m.               | Surface net 8.30 p. m.                 |
| 3387 Dr    | Mar. 8  | 7.21 p. m.  | 7 40 00            | 79 17 50  | 74            |              | 127    | fne. gy. s.          |  |
| 3387 Dr    | Mar. 11 | 6.32 p. m.  | 7 33 00            | 78 34 20  | 71            |              | 85     | stf. gn. n. brk.     |  |
| 3398 Dr    | Mar. 23 | 3.16 p. m.  | 1 07 00            | 80 21 00  | 84            |              | 1,573  | gn. oz.              | Off Galera Point.                      |
| 3399 Dr    | Mar. 24 | 6.37 a. m.  | 1 07 00            | 81 04 00  | 80            |              | 1,740  | gn. oz.              |  |
| 3400 Dr    | Mar. 27 | 6.10 a. m.  | Lat. S.<br>0 36 00 | 86 46 00  | 81            |              | 1,322  | lt. gy. glob. oz.    |  |
| 3409 Dr    | Apr. 3  | 7.24 p. m.  | Lat. N.<br>0 18 40 | 90 34 00  | 82            |              | 327    | bk. s.               | Off Bindloe Island, 4 miles.           |
| 3412 Dr    | Apr. 4  | 6.11 p. m.  | 1 23 00            | 91 43 00  | 82            |              | 918    | r.                   | 5 miles off Wenman Island.             |
| 3413 Dr    | Apr. 5  | 8.34 a. m.  | 2 34 00            | 92 06 00  | 82            |              | 1,360  | glob. oz. dk. sp.    | Surface net 9 p. m.                    |
| 3414 Dr    | Apr. 8  | 11.14 a. m. | 10 14 00           | 96 28 00  | 82            |              | 2,232  | gn. m.               | Surface net noon.                      |
| 3419 Dr    | Apr. 11 | 5.59 p. m.  | 16 34 30           | 100 03 00 | 81            |              | 772    | gn. m. bk. sp.       |  |
| 3433 Dr    | Apr. 21 | 6.34 a. m.  | 25 26 15           | 109 48 00 | 69            |              | 1,218  | br. m. bk. sp.       |  |
| 3434 Dr    | Apr. 21 | 10.14 a. m. | 25 29 30           | 109 48 00 | 70            |              | 1,588  | br. m. bk. sp.       |  |
| 3435 Dr    | Apr. 22 | 8.56 a. m.  | 26 48 00           | 110 45 20 | 70            |              | 859    | br. m. bk. sp.       |  |
| 3436 Dr    | Apr. 22 | 3.10 p. m.  | 27 34 00           | 110 53 40 | 72            |              | 905    | br. m. bk. sp.       |  |

## Record of tow-net stations of the Albatross, 1891, 1892.

[California to Hawaiian Islands.]

| Serial No. <sup>a</sup> | Date.   | Time.       | Position. |           | Temperatures. |            |           | Depth at which used.  | Condition of sea | Wind.      |        | Drift.                   |             | Appearance of sky. | Remarks.                                  |
|-------------------------|---------|-------------|-----------|-----------|---------------|------------|-----------|-----------------------|------------------|------------|--------|--------------------------|-------------|--------------------|---|
|                         |         |             | Lat. N.   | Long. W.  | Air.          | Sur- face. | Bot- tom. |                       |                  | Direction. | Force. | Direction.               | Dis- tance. |                    |   |
|                         | 1891.   |             | ° ' "     | ° ' "     | ° F.          | ° F.       | ° F.      |                       |                  |            |        |                          | Miles.      |                    |   |
| 45                      | Oct. 13 | 11.26 a. m. | 35 41 50  | 126 22 20 | 61            | 62         | 34.9      | Surface               | Moderate         | WNW        | 2      | SW. $\frac{1}{2}$ S      | 0.5         | Cloudy             | Surface tow net.                          |
| 54                      | Oct. 14 | 3.33 p. m.  | 35 03 30  | 129 05 00 | 67            | 66         | 35        | do                    | Smooth           | West.      | 1      | SW. $\frac{1}{2}$ S      | .5          | Clear              | Do.                                       |
| 64                      | Oct. 15 | 7.12 p. m.  | 33 54 30  | 131 45 00 | 66            | 65         | 35        | do                    | do               | West.      | 3      | SW. $\frac{1}{2}$ S      | .5          | do                 | Do.                                       |
| 69                      | Oct. 16 | 8.50 a. m.  | 33 24 00  | 133 01 00 | 67            | 67         | 35.5      | do                    | do               | Calm.      | 0      | SW. $\frac{1}{2}$ S      | .5          | Showery.           | Do.                                       |
| 74                      | Oct. 16 | 6.55 p. m.  | 30 04 30  | 133 56 30 | 67            | 67         |           | do                    | do               | SSE        | 2      | SW. by S                 | .5          | Clear              | Do.                                       |
| 129                     | Nov. 8  | 11.49 a. m. | 32 43 40  | 134 42 30 | 68            | 68         | 35.1      | do                    | do               | ENE        | 2      | SSW. $\frac{1}{2}$ W     | .5          | do                 | Do.                                       |
| 130                     | Nov. 8  | 2.50 p. m.  | 32 41 00  | 134 49 30 | 68            | 68         |           | do                    | do               | ENE        | 2      | SSW. $\frac{1}{2}$ W     | .5          | do                 | Do.                                       |
| 133                     | Nov. 8  | 7.25 p. m.  | 32 35 00  | 135 03 00 | 69            | 68         |           | do                    | do               | East.      | 2      | SSW. $\frac{1}{2}$ W     | .5          | do                 | Do.                                       |
| 144                     | Nov. 9  | 8.43 p. m.  | 31 50 00  | 136 54 30 | 65            | 67         |           | do                    | do               | East.      | 2      | SW. by S                 | .5          | Cloudy             | Do.                                       |
| 149                     | Nov. 10 | 8.47 a. m.  | 31 27 00  | 137 47 00 | 67            | 68         | 35.1      | do                    | do               | ESE        | 1      | SW. by S                 | .5          | do                 | Do.                                       |
| 150                     | Nov. 10 | 11.04 a. m. | 31 23 00  | 137 58 00 | 66            | 67         |           | do                    | do               | ESE        | 2      | SW. by S                 | .5          | Clear              | Do.                                       |
| 152                     | Nov. 10 | 3.16 p. m.  | 31 14 30  | 138 19 00 | 70            | 69         |           | 330 fath.             | do               | East.      | 2      | SW. by S                 | .5          | do                 | Tanner submarine net.                     |
| 153                     | Nov. 10 | 6.00 p. m.  | 31 10 00  | 138 29 30 | 70            | 70         | 35        | Surface               | do               | East.      | 2      | SW. by S                 | .5          | do                 | Surface tow net.                          |
| 154                     | Nov. 10 | 7.42 p. m.  | 31 05 00  | 138 40 00 | 68            | 70         |           | do                    | do               | East.      | 2      | SW. by S                 | .5          | do                 | Do.                                       |
| 163                     | Nov. 11 | 1.10 p. m.  | 30 31 30  | 140 05 30 | 71            | 69         |           | 330 fath.             | do               | East.      | 2      | SW. by S                 | .5          | do                 | Tanner submarine net.                     |
| 165                     | Nov. 11 | 6.00 p. m.  | 30 23 00  | 140 26 30 | 69            | 69         |           | Surface               | do               | East.      | 2      | SW. by S                 | .5          | do                 | Surface tow net.                          |
| 174                     | Nov. 12 | 2.43 p. m.  | 29 38 00  | 142 17 00 | 72            | 70         |           | 330 fath.             | do               | SE         | 1      | SW. by S                 | .5          | do                 | Tanner submarine net.                     |
| 185                     | Nov. 13 | 3.34 p. m.  | 28 52 00  | 144 00 00 | 72            | 72         | 35.3      | Surface               | do               | SE         | 2      | SSW. $\frac{1}{2}$ W     | .5          | Cloudy             | Surface tow net.                          |
| 192                     | Nov. 14 | 9.42 a. m.  | 28 20 00  | 145 03 30 | 72            | 72         |           | do                    | do               | SE         | 2      | SSW. $\frac{1}{2}$ W     | .5          | Clear              | Do.                                       |
| 195                     | Nov. 14 | 6.00 p. m.  | 28 00 30  | 145 35 00 | 73            | 73         |           | do                    | do               | SE         | 1      | SSW. $\frac{1}{2}$ W     | .5          | do                 | Do.                                       |
| 196                     | Nov. 14 | 7.29 p. m.  | 27 54 00  | 145 45 30 | 72            | 72         | 35.2      | do                    | do               | ESE        | 1      | SSW. $\frac{1}{2}$ W     | .5          | do                 | Do.                                       |
| 204                     | Nov. 15 | 2.13 p. m.  | 27 06 00  | 147 14 00 | 75            | 74         |           | 100 fath.             | do               | ESE        | 1      | SSW. $\frac{1}{2}$ W     | .5          | Cloudy             | Tanner submarine net.                     |
| 257                     | Nov. 20 | 2.45 p. m.  | 22 11 00  | 156 09 00 | 77            | 77         | 35.4      | Surface               | do               | NNW        | 2      | SSW. $\frac{1}{2}$ W     | .5          | Clear              | Surface tow net.                          |
| 259                     | Nov. 20 | 7.25 p. m.  | 21 55 30  | 156 29 30 | 78            | 77         |           | do                    | do               | West.      | 1      | SSW. $\frac{1}{2}$ W     | .5          | do                 | Do.                                       |
| 286                     | Dec. 2  | 5.00 p. m.  | 21 15 49  | 157 44 27 | 76            | 75         |           | do                    | do               | NE         | 1.2    | WNW                      | .5          | do                 | Do.                                       |
| 452                     | Dec. 24 | 4.00 p. m.  | 29 52 30  | 138 24 00 | 63            | 67         |           | do                    | do               | ENE        | 3      | NE. by E $\frac{1}{2}$ E | .5          | Cloudy             | Do.                                       |
| 540                     | Jan. 14 | 1.58 p. m.  | 35 19 30  | 125 21 30 | 62            | 58         | 35.1      | 300 fath.             | do               | North      | 2      | NE. $\frac{1}{2}$ E      | .5          | Clear              | Tanner subm. net.                         |
| 541                     | Jan. 14 | 5.17 p. m.  | 35 25 30  | 125 09 30 | 59            | 57         |           | Surface and 300 fath. | do               | NNE        | 1      | NE. $\frac{1}{2}$ E      | .5          | do                 | Tanner submarine net and surface tow net. |
| 542                     | Jan. 14 | 7.19 p. m.  | 35 31 00  | 124 57 30 | 57            | 56         |           | Surface               | do               | NNE        | 2      | NE. $\frac{1}{2}$ E      | .5          | Moonlight          | Surface tow net.                          |
| 543                     | Jan. 14 | 9.28 p. m.  | 35 36 30  | 124 45 30 | 56            | 56         |           | do                    | do               | NNN        | 2      | NE. $\frac{1}{2}$ E      | .5          | do                 | Do.                                       |

<sup>a</sup> Serial numbers indicate cable survey numbers of stations, where Tanner submarine and surface tow nets were used. Numbers same as regular hydrographic series from No. 2655 to 3202.

[Bering Sea—except 3478, California coast.]

## RECORDS OF THE ALBATROSS.

481

| Drift. | Direction.    | Force. | Wind.      |        | Character of bottom. | Depth.      | Temperature.  |      |              | Position. |          | Time.       | Date.   |
|--------|---------------|--------|------------|--------|----------------------|-------------|---------------|------|--------------|-----------|----------|-------------|---------|
|        |               |        | Direction. | Force. |                      |             | Sur-<br>face. | Air. | Bot-<br>tom. | Lat. N.   | Long. W. |             |         |
|        |               |        |            |        |                      | <i>Fms.</i> | °F.           | °F.  | °F.          | °         | '        |             | 1893.   |
| 3478   | SE. by S      | 2      | SW         | 2      | gy. s. m.            | 68          | 53            | 56   | 38.6         | 36 44     | 120 57   | 11 24 a. m. | Apr. 26 |
| 3500   | SE. by E      | 3      | South      | 3      | fne. gy. s. g.       | 121         | 46            | 49   | 38.9         | 56 02     | 169 30   | 11 53 a. m. | July 17 |
| 3501   | SE. E         | 3      | South      | 3      | gn. m.               | 688         | 47            | 50   | 36.9         | 55 51     | 169 18   | 2 16 p. m.  | July 17 |
| 3502   | NNW. † W      | 3      | NNW        | 3      | gn. m. dk. s.        | 368         | 46            | 49   | 37.5         | 55 38     | 169 00   | 6 55 p. m.  | July 17 |
| 3507   | NNW. † W      | 2      | NNW        | 2      | fne. gy. s.          | 31          | 43            | 50   | 42           | 57 43     | 164 42   | 1 00 p. m.  | July 29 |
| 3508   | W. † S        | 2      | NN         | 2      | fne. gy. s. sh.      | 23          | 41            | 43   | 41           | 58 33     | 164 49   | 7 33 p. m.  | July 29 |
| 3517   | WSW. † W      | 4      | West.      | 4      | fne. gy. s.          | 24          | 41            | 41   | 40.3         | 60 27     | 169 04   | 8 01 p. m.  | Aug. 2  |
| 3518   | SSE. † E      | 3      | West.      | 3      | gn. m.               | 36          | 42            | 41   | 33.9         | 60 22     | 171 42   | 6 40 a. m.  | Aug. 3  |
| 3519   | SSE.          | 2      | SSE.       | 2      | bk. m. fne. s.       | 37          | 42            | 43   | 31.1         | 60 06     | 171 25   | 10 03 a. m. | Aug. 3  |
| 3520   | E. by S.      | 3      | SSE.       | 3      | gn. m. fne. s.       | 38          | 43            | 43   | 32.2         | 59 28     | 170 57   | 4 10 p. m.  | Aug. 3  |
| 3521   | ESE.          | 5      | SE         | 5      | gn. m. fne. s.       | 40          | 43            | 43   | 31.9         | 59 09     | 170 48   | 7 35 p. m.  | Aug. 3  |
| 3522   | SSE.          | 4      | SW         | 4      | crs. gy. s. g.       | 41          | 44            | 46   | 35.7         | 57 58     | 170 09   | 9 24 a. m.  | Aug. 4  |
| 3523   | SSE.          | 3      | SSW        | 3      | gn. m. fne. s.       | 39          | 45            | 47   | 38           | 57 39     | 170 02   | 1 18 p. m.  | Aug. 4  |
| 3524   | SSE.          | 4      | SSW        | 4      | gy. s. p.            | 36          | 45            | 46   | 40.3         | 57 24     | 169 56   | 4 08 p. m.  | Aug. 4  |
| 3527   | NW. by W      | 4      | SSW        | 4      | gn. m.               | 52          | 44            | 48   | 38           | 57 48     | 171 21   | 10 35 a. m. | Aug. 5  |
| 3530   | W. † N        | 0      | Calm       | 0      | dk. gn. m. fne. s.   | 59          | 44            | 45   | 34.9         | 59 39     | 173 53   | 7 33 a. m.  | Aug. 6  |
| 3531   | W. † S        | 1      | SE         | 1      | gn. m.               | 59          | 46            | 47   | 35.1         | 59 55     | 174 17   | 11 00 a. m. | Aug. 6  |
| 3532   | SE.           | 3      | N. by E.   | 3      | dk. gn. m. fne. s.   | 77          | 44            | 48   | 34.8         | 59 12     | 175 39   | 7 40 p. m.  | Aug. 6  |
| 3537   | E. † N        | 2      | SW         | 2      | fne. gy. s.          | 49          | 43            | 45   | 38           | 54 45     | 169 06   | 6 55 a. m.  | Aug. 9  |
| 3538   | E. † N        | 2      | West.      | 2      | gn. m. s.            | 59          | 46            | 48   | 38           | 56 41     | 168 29   | 3 49 p. m.  | Aug. 9  |
| 3539   | E. † S        | 3      | SW         | 3      | gn. m. s.            | 57          | 45            | 49   | 38.9         | 56 34     | 167 19   | 9 12 p. m.  | Aug. 9  |
| 3540   | East.         | 3      | SSW        | 3      | gn. m. fne. s.       | 51          | 46            | 47   | 36.1         | 56 27     | 166 08   | 3 12 p. m.  | Aug. 9  |
| 3541   | E. † N        | 3      | SSE        | 3      | bk. m. fne. s.       | 49          | 46            | 48   | 39.2         | 56 14     | 164 08   | 5 19 a. m.  | Aug. 10 |
| 3542   | SE. by E. † E | 3      | SE         | 3      | dk. m. fne. s.       | 49          | 47            | 49   | 42.7         | 56 40     | 163 26   | 8 43 a. m.  | Aug. 10 |
| 3543   | East.         | 2      | WNW        | 2      | bk. s. sh.           | 43          | 44            | 48   | 42.7         | 56 41     | 169 39   | 4 17 p. m.  | Aug. 10 |
| 3544   | WSW           | 2      | NW by N    | 2      | fne. gy. s. sh.      | 41          | 44            | 47   | 41.1         | 56 50     | 169 59   | 7 20 p. m.  | Aug. 18 |
| 3545   | NNE. † E      | 5      | West       | 5      | gn. m. fne. s. c.    | 1,020       | 48            | 52   | 36           | 56 15     | 171 33   | 5 07 p. m.  | Aug. 21 |
| 3547   | NNE. † E      | 3      | South      | 3      | fne. bk. s.          | 51          | 47            | 47   | 45           | 54 16     | 165 45   | 12 38 p. m. | Aug. 31 |
| 3548   | W. † S        | 5      | East.      | 5      | bk. s.               | 91          | 47            | 52   | 39.5         | 54 44     | 165 42   | 9 03 a. m.  | Sept. 1 |
| 3549   | NNW. † W      | 5      | E. by S    | 5      | fne. bk. s.          | 76          | 49            | 53   | 40.1         | 55 00     | 166 10   | 4 26 p. m.  | Sept. 1 |
| 3551   | NNW. † W      | 3      | NE         | 3      | br. m.               | 74          | 47            | 49   | 39.1         | 55 24     | 167 02   | 6 56 p. m.  | Sept. 1 |
| 3553   | N. by W. † W  | 3      | NE         | 3      | gn. m.               | 51          | 48            | 48   | 39.5         | 55 38     | 167 28   | 7 58 a. m.  | Sept. 2 |
| 3554   | N. by W. † W  | 4      | NNE.       | 4      | fne. gy. s. m.       | 62          | 47            | 48   | 39.5         | 56 34     | 170 19   | 10 33 a. m. | Sept. 2 |
| 3555   | N. by W. † W  | 4      | NNE.       | 4      | gn. m.               | 57          | 46            | 47   | 40.2         | 56 45     | 170 18   | 12 41 p. m. | Sept. 2 |
| 3556   | NW. by W      | 4      | NE         | 4      | gn. m. fne. s.       | 49          | 46            | 49   | 41           | 56 57     | 170 33   | 3 21 p. m.  | Sept. 2 |
| 3559   | East.         | 4      | NE. by E.  | 4      | gy. s. brk. sh.      | 39          | 46            | 47   | 42.5         | 56 56     | 169 52   | 9 17 a. m.  | Sept. 3 |



## Record of Tanner intermediate tow-net stations of the Albatross, 1893.

[Condition of sea, smooth.]

| Serial No. | Date.   | Time.       | Position.                   |           | Temperature. |          | Depth (in fathoms). | Wind.      |        | Appearance of sky. | Remarks.                      |
|------------|---------|-------------|-----------------------------|-----------|--------------|----------|---------------------|------------|--------|--------------------|-------------------------------|
|            |         |             | Lat. N.                     | Long. W.  | Air.         | Surface. |                     | Direction. | Force. |                    |                               |
| 31         | 1893.   |             | <i>California coast.</i>    |           |              |          |                     |            |        |                    |                               |
|            | Apr. 26 | 10.11 a. m. | ° ' "                       | ° ' "     | ° F.         | ° F.     | 5 to surface.       | N.         | 1      | Clear.             | Entire net open.              |
| 32         | Apr. 27 | 8.30 a. m.  | 37 29 00                    | 123 01 20 | 58           | 54       | 100 to surface      | WNW        | 3      | do.                | All specimens from upper net. |
| 33         | Aug. 3  | 6.40 a. m.  | <i>Bering Sea.</i>          |           |              |          |                     |            |        |                    |                               |
|            |         | 6.40 a. m.  | 60 22 00                    | 171 42 00 | 41           | 42       | 25 to surface       | W          | 3      | Cloudy             | Specimens from both nets.     |
|            |         | 6.40 a. m.  | 60 22 00                    | 171 42 00 | 41           | 42       | 25 fathoms a        | W          | 3      | do.                |                               |
|            |         | 10.03 a. m. | 60 06 00                    | 171 25 00 | 43           | 42       | 25 to surface       | SSE        | 2      | do.                | Do.                           |
|            |         | 10.03 a. m. | 60 06 00                    | 171 25 00 | 43           | 42       | 25 fathoms a        | SSE        | 2      | do.                |                               |
|            |         | 9.24 a. m.  | 57 58 00                    | 170 09 00 | 46           | 44       | 30 to surface       | SW         | 4      | do.                | Do.                           |
|            |         | 9.24 a. m.  | 57 58 00                    | 170 09 00 | 46           | 44       | 30 to surface       | SW         | 4      | do.                |                               |
|            |         | 9.24 a. m.  | 57 58 00                    | 170 09 00 | 46           | 44       | 30 fathoms a        | SW         | 4      | do.                | All specimens from upper net. |
|            |         | 7.33 a. m.  | 59 39 00                    | 173 53 00 | 45           | 44       | 43 to surface       | Calm       | 0      | do.                |                               |
|            |         | 7.33 a. m.  | 59 39 00                    | 173 53 00 | 45           | 44       | 43 fathoms a        | Calm       | 0      | do.                | Specimens from both nets.     |
|            |         | 11.00 a. m. | 59 55 00                    | 174 17 00 | 47           | 46       | 44 to surface       | SE         | 1      | do.                |                               |
|            |         | 11.00 a. m. | 59 55 00                    | 174 17 00 | 47           | 46       | 44 fathoms a        | SE         | 1      | do.                | Do.                           |
|            |         | 6.55 a. m.  | 54 45 00                    | 169 06 00 | 45           | 43       | 40 to surface       | SW         | 2      | do.                |                               |
|            |         | 6.55 a. m.  | 54 45 00                    | 169 06 00 | 45           | 43       | 40 fathoms a        | SW         | 2      | do.                | Do.                           |
|            |         | 8.43 a. m.  | 56 10 00                    | 163 26 00 | 49           | 47       | 30 to surface       | SE         | 3      | do.                |                               |
|            |         | 8.43 a. m.  | 56 10 00                    | 163 26 00 | 49           | 47       | 30 to surface       | SE         | 3      | do.                | Do.                           |
|            |         | 4.17 p. m.  | 56 41 00                    | 169 39 00 | 48           | 44       | 30 to surface       | WNW        | 2      | Overcast           |                               |
|            |         | 4.17 p. m.  | 56 41 00                    | 169 39 00 | 48           | 44       | 30 fathoms a        | WNW        | 2      | do.                | Do.                           |
|            |         | 4.03 p. m.  | 54 38 00                    | 175 27 00 | 56           | 49       | 125 to surface      | NNE        | 3      | do.                |                               |
|            |         | 4.03 p. m.  | 54 38 00                    | 175 27 00 | 56           | 49       | 125 fathoms a       | NNE        | 3      | do.                | Do.                           |
|            |         | 9.48 a. m.  | 55 46 00                    | 172 44 00 | 51           | 48       | 250 to surface      | W          | 5      | do.                |                               |
|            |         | 9.48 a. m.  | 55 46 00                    | 172 44 00 | 51           | 48       | 250 fathoms a       | W          | 5      | do.                | Do.                           |
|            |         | 9.48 a. m.  | 54 59 00                    | 171 49 00 | 49           | 48       | 100 to surface      | SE by S    | 2      | Cloudy             |                               |
|            |         | 1.29 p. m.  | 54 59 00                    | 171 49 00 | 49           | 48       | 100 fathoms a       | SE by S    | 2      | do.                | Do.                           |
|            |         | 9.03 a. m.  | 54 44 00                    | 165 42 00 | 52           | 47       | 50 to surface       | E          | 3      | do.                |                               |
|            |         | 9.03 a. m.  | 54 44 00                    | 165 42 00 | 52           | 47       | 50 fathoms a        | E          | 3      | do.                | Do.                           |
|            |         | 9.03 a. m.  | 54 44 00                    | 165 42 00 | 52           | 47       | 50 fathoms a        | E          | 3      | do.                |                               |
|            | Sept. 1 |             |                             |           |              |          |                     |            |        |                    |                               |
|            | Sept. 1 |             |                             |           |              |          |                     |            |        |                    |                               |
| 45         | 1894.   |             | <i>Coast of Washington.</i> |           |              |          |                     |            |        |                    |                               |
|            | Apr. 30 | 1.08 p. m.  | 48 14 30                    | 122 58 00 | 53           | 46       | 4 to surface        | W          | 1      | Clear.             | Do.                           |

a Lower net closed at this depth by messenger.

| Serial No. | Date.   | Position.          |           | Temperature. |        | Time of day. | Depth of net. | Length of trial. | Net used.    | Result.   |
|------------|---------|--------------------|-----------|--------------|--------|--------------|---------------|------------------|--------------|---|
|            |         | Lat. N.            | Long. W.  | Surface.     | Depth. |              |               |                  |              |   |
|            |         | <i>Bering Sea.</i> |           |              |        |              |               |                  |              |   |
|            | 1895.   | ° ' "              | ° ' "     | ° F.         |        |              | <i>Fms.</i>   | <i>Min.</i>      |              |   |
| 46         | Aug. 5  | 55 06              | 169 08 00 | 46           | 38.2   | 1.17 p. m.   | Surface.      | 26               | Intermediate | Abundance small crustacea, young shrimps, and sagitta.  |
| 47         | Aug. 7  | 55 06              | 169 08 00 |              |        | 1.17 p. m.   | Surface.      | 26               | Surface      | 2 small fish and abundance of small crustacea.  |
| 48         | Aug. 7  | 55 36              | 170 45 00 | 44           |        | 11.28 a. m.  | Surface.      | 23               | Intermediate | Numerous small crustacea and sagitta.   |
|            |         | 55 36              | 170 45 00 | 44           |        | 11.28 a. m.  | Surface.      | 23               | Surface      | Few small crustacea and sagitta.  |
|            |         | 55 10              | 170 56 00 | 45           | 38     | 7.17 p. m.   | Surface.      | 27               | Intermediate | Numerous small crustacea and sagitta and 4 small fish.  |
|            |         | 55 11              | 170 56 00 | 45           |        | 7.17 p. m.   | Surface.      | 27               | Surface      | Abundance of small crustacea and sagitta.   |
|            |         | 55 11              | 171 13 00 | 45           |        | 10.00 p. m.  | Surface.      | 20               | do           | Abundance of small crustacea and siphonophore.  |
| 49         | Aug. 8  | 55 53              | 171 40 00 | 45           | 37.4   | 10.43 a. m.  | 10 feet.      | 58               | Intermediate | Numerous small crustacea and sagitta.   |
|            |         | 55 53              | 171 40 00 | 45           |        | 11.30 a. m.  | 10 feet.      | 16               | Surface      | Very few crustacea and sagitta.   |
| 50         | Aug. 8  | 55 44              | 171 17 00 | 44           | 37.7   | 5.08 p. m.   | 100           | 20               | Intermediate | 2 small fish, abundance amphipod crustacea.   |
|            |         | 55 44              | 171 17 00 | 44           |        | 5.15 p. m.   | 20 feet.      | 20               | Surface      | 10 small fish, few crustacea and fish eggs.   |
| 51         | Aug. 10 | 56 15              | 172 35 00 |              |        | 1.40 p. m.   | 43            | 23               | Intermediate | Abundance small crustacea of several species; numerous sagitta.   |
|            |         | 56 15              | 172 35 00 |              |        | 1.40 p. m.   | 2             | 24               | Surface      | 1 very small squid; few larval shells; abundance pelagic refuse.  |
| 52         | Aug. 10 | 56 13              | 172 20 00 | 45           |        | 4.27 p. m.   | 50            | 21               | Intermediate | Minute crustacea of several species; few sagitta.   |
| 53         | Aug. 11 | 56 13              | 172 20 00 | 45           |        | 4.27 p. m.   | Surface.      | 15               | Surface      | Quantity of small crustacea.  |
|            |         | 55 23              | 170 31 00 |              |        | 12.43 p. m.  | 48            | 23               | Intermediate | 1 young gadoid; few medusæ and annelida; 1 embryo octopus; sagitta and crustacea.                             |
|            |         | 55 23              | 170 31 00 |              |        | 12.43 p. m.  | Surface.      | 23               | Surface      | Quantity brownish pelagic refuse.   |
|            |         |                    |           |              |        | 2.47 p. m.   | Surface.      | 25               | do           | Quantity of brownish spicules and pelagic refuse.   |
|            |         |                    |           | 45           |        | 10.00 p. m.  | Surface.      | 20               | do           | Few small red medusæ; 1 large white medusæ; many small crustacea and worms.                                   |
| 54         | Aug. 12 | 54 54              | 168 59 00 | 45           | 39.5   | 11.47 a. m.  | 25            | 30               | Intermediate | Numerous small crustacea and sagitta.   |
|            |         | 54 54              | 168 59 00 | 45           |        | 11.47 a. m.  | Surface.      | 30               | Surface      | 2 small fish; few medusæ, worms, and crustacea.   |
|            |         |                    |           |              |        | 9.45 p. m.   | Surface.      | 20               | do           | Few large brown medusæ; few smaller medusæ; 4 young cod; few small pelagic fishes; many small crustacea, etc. |
| 55         | Aug. 13 |                    |           |              |        | 12.53 p. m.  | 30            | 25               | Intermediate | 3 species small medusæ; several species minute crustacea; small cod; small invertebrates.                     |
|            |         |                    |           |              |        | 12.53 p. m.  | Surface.      | 25               | Surface      | Abundance brownish algae and pelagic refuse; few larval squid.  |
|            |         |                    |           |              |        | 5.10 p. m.   | Surface.      | 40               | do           | Few small medusæ, abundance sagitta, and minute crustacea.  |
| 56         | Aug. 18 |                    |           |              |        | 5.00 p. m.   | 200           | 32               | Intermediate | Quantity of larval shells, minute crustacea, and minute brownish algae.                                       |
|            |         |                    |           |              |        | 5.00 p. m.   | Surface.      | 32               | Surface      | Abundance sagitta and minute crustacea; few larval squid.   |
| 57         | Aug. 19 | 54 17              | 168 53 30 |              |        | 12.00 m.     | 50            | 25               | Intermediate | Small quantity sagitta and minute black crustacea; few small medusæ, larval crabs, and small pelagic fish.    |
|            |         | 54 17              | 168 53 30 |              |        | 12.00 m.     | Surface.      | 25               | Surface      | Few sagitta, crimson prawns, small medusæ, larval ophiurans; few ascidians; crustacea.                        |
| 58         | Aug. 19 |                    |           |              |        |              | 575           | 30               | Intermediate |   |

## Record of Townsend intermediate and surface tow-net stations of the Albatross, 1895—Continued.

| Serial No. | Date.            | Position.          |           | Temperature. |        | Time of day. | Depth of net. | Length of trial. | Net used.    | Result.   |
|------------|------------------|--------------------|-----------|--------------|--------|--------------|---------------|------------------|--------------|---|
|            |                  | Lat. N.            | Long. W.  | Surface.     | Depth. |              |               |                  |              |   |
|            |                  | <i>Bering Sea.</i> |           |              |        |              |               | <i>Min.</i>      |              |   |
| 58         | 1895.<br>Aug. 19 | ° ' "              | ° ' "     | ° F.         |        |              | Surface.      | 30               | Surface      | Quantity of larval shells, small crustacea, and medusæ. Hauled with electric light.   |
| 59         | Aug. 20          |                    |           |              |        | 9.25 p. m.   | Surface.      | 25               | do           |   |
|            |                  |                    |           |              |        | 12.01 p. m.  | 200           | 20               | Intermediate |   |
| 59         | Aug. 20          | 55 19              | 168 11 00 |              |        | 12.01 p. m.  | Surface.      | 20               | Surface      | Struck bottom; sagitta and minute pink crustacea; small ophiurans; 3 small fishes; worms. Few small crustacea.                                    |
| 60         | Aug. 20          | 55 11              | 167 56 00 |              |        | 9.55 a. m.   | Surface.      |                  | do           |   |
|            |                  |                    |           |              |        | 10.15 p. m.  | 70            |                  | do           |   |
|            |                  |                    |           |              |        |              | Surface.      | 25               | Intermediate | Abundance of small crustacea and sagitta. Similar to above.   |
|            |                  |                    |           |              |        | 10.35 p. m.  | Surface.      | 20               | Surface      |   |
| 61         | Aug. 21          |                    |           |              |        | 9.20 p. m.   | Surface.      | 20               | Intermediate |   |
|            |                  |                    |           |              |        | 9.20 p. m.   | Surface.      | 20               | Surface      | Abundance minute pinkish crustacea of many species. Small quantity ova and larval squid; many larval crabs; few small pelagic fishes; brown algæ. |
|            |                  |                    |           |              |        |              | Surface.      |                  | Intermediate |   |
| 62         | Aug. 21          |                    |           |              |        |              | Surface.      | 20               | Surface      |   |
|            |                  |                    |           |              |        |              | Surface.      | 20               | Intermediate | Abundance small crustacea and sagitta. Few crustacea.   |
|            |                  |                    |           |              |        | 9.18 p. m.   | Surface.      | 25               | Surface      |   |
| 63         | Aug. 22          |                    |           |              |        | 9.18 p. m.   | Surface.      | 25               | Surface      |   |
|            |                  |                    |           |              |        |              | Surface.      |                  | Surface      | Few larval Gadidæ and squid; abundance of petropods with shells; few small medusæ. Usual sagitta and crustacea.                                   |
|            |                  |                    |           |              |        |              | Surface.      |                  | Surface      |   |
|            |                  |                    |           |              |        |              | Surface.      |                  | Surface      |   |

| Serial No. | Agassiz serial No. | Date.   | Time.       | Position and true bearings.                                   |           | Temperatures. |            |           | Depth.           | Character of bottom.   | Wind.      |        | Remarks.                         |
|------------|--------------------|---------|-------------|---|-----------|---------------|------------|-----------|------------------|------------------------|------------|--------|----------------------------------|
|            |                    |         |             | Lat. N.   | Long. W.  | Air.          | Sur- face. | Bot- tom. |                  |                        | Direction. | Force. |                                  |
|            |                    | 1899.   |             | <i>San Francisco, Cal., to Nukuhiva Isd., Marquesas Isds.</i> |           |               |            |           |                  |                        |            |        |                                  |
| Hy. 3778   | 1                  | Aug. 26 | 4.52 a. m.  | 31 10 00  | 125 00 00 | ° F. 62       | ° F. 64    |           | Fms. 1,955       | No specimen.           | NNW        | 3      | Open intermediate to 300 fms.    |
| Hy. 3778   | 1                  | Aug. 26 | 5.06 a. m.  | 31 10 00  | 125 00 00 | 62            | 64         |           | 1,955            | do                     | NNW        | 2      | Surface 31 minutes.              |
| Dr. 3681   | 2                  | Aug. 27 | 10.15 a. m. | 28 23 00  | 126 57 00 | 66            | 66         | 34.6      | 2,368            | lt. br. vol. oz.       | N          | 3      | Open intermediate to 350 fms.    |
| Dr. 3681   | 2                  | Aug. 27 | 3.36 p. m.  | 28 23 00  | 126 57 00 | 67            | 66         | 34.6      | 2,368            | lt. br. vol. oz.       | NE. by N   | 2      | Open intermediate to 100 fms.    |
| Dr. 3681   | 2                  | Aug. 27 | 4.25 p. m.  | 28 23 00  | 126 57 00 | 67            | 66         | 34.6      | 2,368            | lt. br. vol. oz.       | NE         | 2      | Open intermediate to 100 fms.    |
| Substation |                    | Aug. 27 | 8.20 p. m.  | 28 11 00  | 127 16 00 | 66            | 65         |           | (Did not sound.) |                        | NNE        | 2      | Surface 20 minutes.              |
| Substation | 3                  | Aug. 28 | 3.42 p. m.  | 26 18 00  | 128 54 00 | 69            | 68         |           | (Did not sound.) |                        | NNE        | 3      | Open intermediate to 200 fms.    |
| Hy. 3779   | 4                  | Aug. 29 | 9.41 a. m.  | 24 45 00  | 130 16 00 | 70            | 68         | 34.6      | 2,628            | lt. br. vol. oz.       | NNE        | 4      | Open intermediate to 500 fms.    |
| Hy. 3779   | 4                  | Aug. 29 | 9.35 a. m.  | 24 45 00  | 130 16 00 | 70            | 68         | 34.6      | 2,628            | lt. br. vol. oz.       | NNE        | 5      | Surface 25 minutes.              |
| Hy. 3779   | 4                  | Aug. 29 | 10.03 a. m. | 24 45 00  | 130 16 00 | 71            | 68         | 34.6      | 2,628            | lt. br. vol. oz.       | NNE        | 5      | Surface 8 minutes.               |
| Hy. 3780   | 5                  | Aug. 30 | 8.30 a. m.  | 22 42 00  | 131 54 00 | 71            | 70         | 34.6      | 2,740            | br. vol. oz.           | N. by E    | 4      | Surface 20 minutes.              |
| Hy. 3780   | 5                  | Aug. 30 | 8.23 a. m.  | 22 42 00  | 131 54 00 | 71            | 70         | 34.6      | 2,740            | br. vol. oz.           | N. by E    | 4      | Open intermediate to 150 fms.    |
| Hy. 3781   | 6                  | Aug. 31 | 9.56 a. m.  | 20 26 00  | 133 28 00 | 75            | 75         |           | 2,810            | dk. br. vol. oz.       | NE         | 2      | Surface 14 minutes.              |
| Hy. 3781   | 6                  | Aug. 31 | 10.05 a. m. | 20 26 00  | 133 28 00 | 75            | 75         |           | 2,810            | dk. br. vol. oz.       | NE         | 2      | Open intermediate to 150 fms.    |
| Hy. 3782   | 7                  | Sept. 1 | 9.26 a. m.  | 18 19 00  | 134 57 00 | 77            | 76         |           | 2,881            | dk. br. vol. oz.       | NNE        | 2      | Do.                              |
| Hy. 3782   | 7                  | Sept. 1 | 9.30 a. m.  | 18 19 00  | 134 57 00 | 78            | 76         |           | 2,881            | dk. br. vol. oz.       | NNE        | 1      | Surface 15 minutes.              |
| Substation |                    | Sept. 1 | 8.06 p. m.  | 17 32 00  | 135 40 00 | 76            | 76         |           | (Did not sound.) |                        | NNE        | 2      | Surface 19 minutes.              |
| Hy. 3786   | 12                 | Sept. 4 | 10.05 a. m. | 12 07 00  | 137 18 00 | 82            | 81         |           | 2,883            | lt. br. rad. oz.       | NNE        | 4      | Open intermediate to 150 fms.    |
| Hy. 3786   | 12                 | Sept. 4 | 10.13 a. m. | 12 07 00  | 137 18 00 | 82            | 81         |           | 2,883            | lt. br. rad. oz.       | NE         | 4      | Surface 13 minutes.              |
| Substation |                    | Sept. 4 | 7.55 p. m.  | 10 57 35  | 137 35 25 | 80            | 80         |           | (Did not sound.) |                        | NE         | 3      | Surface 22 minutes.              |
| Substation |                    | Sept. 4 | 8.48 p. m.  | 10 57 35  | 137 35 25 | 80            | 80         |           | (Did not sound.) |                        | NE         | 3      | Surface 15 minutes.              |
| Dr. 3683   | 13                 | Sept. 5 | 10 a. m.    | 9 57 00   | 137 47 00 | 83            | 82         |           | 2,690            | lt. br. m. rad. oz.    | NE         | 2      | Surface 25 minutes.              |
| Dr. 3683   | 13                 | Sept. 5 | 1.30 p. m.  | 9 57 00   | 137 47 00 | 84            | 82         |           | 2,690            | lt. br. m. rad. oz.    | E          | 2      | Surface 15 minutes.              |
| Substation |                    | Sept. 5 | 8.08 p. m.  | 9 26 00   | 137 49 00 | 82            | 82         |           | (Did not sound.) |                        | E          | 2      | Surface 21 minutes.              |
| Hy. 3787   | 14                 | Sept. 7 | 10 a. m.    | 6 41 00   | 137 00 00 | 81            | 82         |           | 2,776            | lt. gy. glob. oz.      | E. by S    | 3      | Open intermediate to 150 fms.    |
| Hy. 3787   | 14                 | Sept. 7 | 10.03 a. m. | 6 41 00   | 137 00 00 | 81            | 82         |           | 2,776            | lt. gy. glob. oz.      | E. by S    | 3      | Surface 15 minutes.              |
| Substation |                    | Sept. 7 | 8.01 p. m.  | 5 40 00   | 136 47 00 | 81            | 81         |           | (Did not sound.) |                        | SE         | 3      | Surface 20 minutes.              |
| Substation |                    | Sept. 7 | 8.22 p. m.  | 5 40 00   | 136 47 00 | 81            | 81         |           | (Did not sound.) |                        | SE         | 3      | Elec. light and dip nets 18 min. |
| Hy. 3788   | 15                 | Sept. 8 | 9.58 a. m.  | 4 35 00   | 136 54 00 | 81            | 80         |           | 2,583            | lt. gy. oz. glob. rad. | SE         | 3      | Open intermediate to 150 fms.    |
| Hy. 3788   | 15                 | Sept. 8 | 10 a. m.    | 4 35 00   | 136 54 00 | 81            | 80         |           | 2,583            | lt. gy. oz. glob. rad. | SE         | 3      | Surface 15 minutes.              |
| Substation |                    | Sept. 8 | 8.01 p. m.  | 3 28 00   | 136 54 00 | 80            | 80         |           | (Did not sound.) |                        | E. by S    | 3      | Surface 20 minutes.              |
| Hy. 3789   | 16                 | Sept. 9 | 9.23 a. m.  | 2 38 00   | 137 22 00 | 82            | 80         | 35.2      | 2,440            | lt. gy. glob. oz.      | SE. by E   | 3      | Do.                              |
| Hy. 3789   | 16                 | Sept. 9 | 9.28 a. m.  | 2 38 00   | 137 22 00 | 82            | 80         | 35.2      | 2,440            | lt. gy. glob. oz.      | SE. by E   | 3      | Open intermediate to 250 fms.    |

Record of intermediate and surface tow-net stations of the *Albatross*, 1899-1900—Continued.

| Serial No. | Agassiz serial No. | Date.    | Time.       | Position and true bearings.   |           | Temperatures. |               |              | Depth.           | Character of bottom.   | Wind.      |        | Remarks.                        |
|------------|--------------------|----------|-------------|---|-----------|---------------|---------------|--------------|------------------|------------------------|------------|--------|---------------------------------|
|            |                    |          |             | Lat. N.   | Long. W.  | Air.          | Sur-<br>face. | Bot-<br>tom. |                  |                        | Direction. | Force. |                                 |
|            |                    | 1899.    |             | ° ' "   | ° ' "     | ° F.          | ° F.          | ° F.         | Fms.             | (Did not sound.)       | SE. by E   | 3      | Surface 20 minutes.             |
| Substation | Substation         | Sept. 9  | 7.20 p. m.  | 1 45 00   | 137 36 00 | 80            | 79            | ---          | (Did not sound.) | ---                    | SE. by E   | 2      | Tanner intermediate to 350 fms. |
| Substation | Substation         | Sept. 9  | 7.35 p. m.  | 1 45 00   | 137 36 00 | 80            | 79            | ---          | 2,463            | gy. vl. glob. oz       | SE         | 3      | Surface 15 minutes.             |
| Dr. 3634   | 17                 | Sept. 10 | 10.45 a. m. | 0 50 00   | 137 54 00 | 80            | 80            | ---          | ---              | ---                    | ---        | ---    | ---                             |
|            |                    |          |             | Lat. S.   |           |               |               |              |                  |                        |            |        |                                 |
| Hy. 3790   | 18                 | Sept. 13 | 9.38 a. m.  | 6 25 00   | 138 59 00 | 81            | 80            | 35           | 2,475            | lt. gy. glob. oz       | ESE        | 5      | Surface 20 minutes.             |
| Hy. 3790   | 18                 | Sept. 13 | 9.48 a. m.  | 6 25 00   | 138 59 00 | 81            | 80            | 35           | 2,475            | lt. gy. glob. oz       | ESE        | 5      | Open intermediate to 400 fms.   |
| Dr. 3635   | 25                 | Sept. 14 | 2.30 p. m.  | Haunanu Point, UaHuka Isd.  |           | 81            | 80            | 38           | 890              | vol. s. glob           | E          | 2      | Surface 20 minutes.             |
| Dr. 3635   | 25                 | Sept. 14 | 2.57 p. m.  | S. 72° E. (true), dist. 13 m.   |           | 81            | 80            | 38           | 890              | vol. s. glob           | E. by N    | 2      | Surface 18 minutes.             |
| Hy. 3797   | 26                 | Sept. 14 | 9 p. m.     | Haunanu Point, UaHuka Isd. E., dist. 17 m.                            |           | 80            | 80            | ---          | 1,173            | gy. vol. oz            | E. by N    | 2      | Surface 15 minutes.             |
| Hy. 3797   | 26                 | Sept. 14 | 9.05 p. m.  | do  |           | 80            | 80            | ---          | 1,173            | gy. vol. oz            | E. by N    | 2      | Open intermediate to 300 fms.   |
| Hy. 3798   | 27                 | Sept. 15 | 7.01 a. m.  | Cape Martin, Nukuhiva Isd., N. 30° E., dist. 64 m.                    |           | 80            | 80            | 39.5         | 687              | drab vol. oz. glob.    | E          | 3      | Do.                             |
|            |                    |          |             | Nukuhiva, Marquesas Isds., to Tahiti, Society Isds., via NW. Faumotu. |           |               |               |              |                  |                        |            |        |                                 |
| Hy. 3801   | 30                 | Sept. 18 | 9.28 a. m.  | 10 29 00  | 141 52 00 | 81            | 81            | 35           | 2,456            | lt. gy. vol. oz. glob. | SE. by E   | 3      | Surface 20 minutes.             |
| Hy. 3801   | 30                 | Sept. 18 | 9.33 a. m.  | 10 29 00  | 141 52 00 | 81            | 81            | 35           | 2,456            | lt. gy. vol. oz. glob. | SE. by E   | 3      | Open intermediate to 300 fms    |
| Dr. 3636   | 31                 | Sept. 19 | 9.42 a. m.  | 12 20 00  | 144 15 00 | 79            | 79            | 35           | 2,700            | red. c.---             | SE. by E   | 3      | Surface 30 minutes.             |
| Substation | Substation         | Sept. 19 | 6.59 p. m.  | 12 41 00  | 144 40 00 | 78            | 80            | ---          | (Did not sound.) | ---                    | E          | 2      | Surface 21 minutes.             |
| Substation | Substation         | Sept. 19 | 7.15 p. m.  | 12 41 00  | 144 40 00 | 78            | 80            | ---          | (Did not sound.) | ---                    | E          | 2      | Open intermediate to 300 fms.   |
| Hy. 3802   | 32                 | Sept. 20 | 9.18 a. m.  | 13 37 00  | 145 42 00 | 83            | 80            | 35           | 2,451            | red. c. foram.         | E          | 3      | Surface 20 minutes.             |
| Hy. 3802   | 32                 | Sept. 20 | 9.26 a. m.  | 13 37 00  | 145 42 00 | 83            | 80            | 35           | 2,451            | red. c. foram.         | E          | 3      | Open intermediate to 300 fms.   |
| Substation | Substation         | Sept. 24 | 8.02 p. m.  | 15 24 30  | 147 59 40 | 77            | 80            | ---          | (Did not sound.) | ---                    | SE         | 2      | Surface 24 minutes.             |
|            |                    |          |             | From Tahiti, Society Isds., through Faumotu Archipelago.              |           |               |               |              |                  |                        |            |        |                                 |
| Dr. 3637   | 74                 | Oct. 5   | 8.40 a. m.  | Point Venus, Tahiti Isd., S. 82° E., 4.8 m.                           |           | 74            | 79            | ---          | 725              | fne. vol. s. vl. m.    | ENE        | 1      | Surface 15 minutes.             |

| Substation | Substation | Substation | Oct. 5          | 7.08 p. m.  | 16 39 00           | 149 11 00 | 78 | 79 | (Did not sound.) | E        | °3  | Surface 20 minutes.           |
|------------|------------|------------|-----------------|-------------|--------------------|-----------|----|----|------------------|----------|-----|-------------------------------|
| Substation | Substation | Substation | Oct. 5          | 7.19 p. m.  | 16 39 00           | 149 11 00 | 78 | 79 | (Did not sound.) | E        | °3  | Open intermediate to 350 fms. |
| Hy. 3880   | 91         | 91         | Oct. 14         | 3.56 p. m.  | SW. end            | Fakara    | 87 | 80 | 602              | ESE      | 3   | Surface 20 minutes.           |
|            |            |            |                 |             | va, N.E. 2 m.      |           |    |    |                  |          |     |                               |
| Hy. 3860   | 91         | 91         | Oct. 14         | 4.12 p. m.  | do                 |           | 87 | 80 | 602              | ESE      | 3   | Open intermediate to 300 fms. |
| Dr. 3888   | 133        | 133        | Oct. 28         | 8.15 a. m.  | NW. point          | Maro-     | 80 | 78 | 742              | NE. by E | 2   | Surface 12 minutes.           |
|            |            |            |                 |             | kan, E. 2 m.       |           |    |    |                  |          |     |                               |
| Dr. 3888   | 133        | 133        | Oct. 28         | 11.50 a. m. | do                 |           | 80 | 79 | 742              | ENE      | 2   | Open intermediate to 350 fms. |
| Dr. 3880   | 139        | 139        | Oct. 29         | 10.28 a. m. | NW. Face,          | Hao       | 83 | 79 | 812              | NE       | 2   | Surface 16 minutes.           |
|            |            |            |                 |             | Atoll, E. 2 m.     |           |    |    |                  |          |     |                               |
| Dr. 3891   | 173        | 173        | Nov. 4          | 9.15 a. m.  | 18 55 00           | 146 32 00 | 78 | 78 | 2,440            | E        | 2   | Surface 21 minutes.           |
| Dr. 3891   | 173        | 173        | Nov. 4          | 12.54 p. m. | 18 55 00           | 146 32 00 | 82 | 79 | 2,440            | E        | 1   | Open intermediate to 100 fms. |
| Dr. 3891   | 173        | 173        | Nov. 4          | 2.22 p. m.  | 18 55 00           | 146 32 00 | 82 | 80 | 2,440            | E        | 1   | Open intermediate to 300 fms. |
|            |            |            |                 |             | From Tahiti, So-   |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | cietty Isds., via  |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | Leeward, Cook,     |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | Nine, Tonga,       |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | and Fiji Isds., to |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | Suva, Fiji Isds.   |           |    |    |                  |          |     |                               |
| Substation | Substation | Substation | Nov. 16         | 10.23 a. m. | Huabeine Island,   |           | 82 |    | (Did not sound.) | NW. by N | 1   | Surface 9 minutes.            |
|            |            |            |                 |             | SE. 5 m.           |           |    |    |                  |          |     |                               |
| Dr. 3892   | 183        | 183        | Nov. 24         | 9.30 a. m.  | 19 04 00           | 167 41 00 | 82 | 80 | 2,472            | E        | 1   | Surface 25 minutes.           |
|            |            |            |                 |             | Through Gilbert    |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | and Ellice         |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | chains to Jaluit,  |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | Marshall Isds.     |           |    |    |                  |          |     |                               |
| Hy. 3958   | 196        | 196        | 1900.<br>Jan. 1 | 11.57 a. m. | Lat. N.   Long. E. |           | 92 | 88 | (Did not sound.) | NNW      | 0-1 | Surface 31 minutes.           |
|            |            |            |                 |             | Village, south     |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | coast Apamama      |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | Island, N. 4 m.    |           |    |    |                  |          |     |                               |
| Hy. 3958   | 196        | 196        | Jan. 1          | 12.07 p. m. | do                 |           | 92 | 86 | (Did not sound.) | NNW      | 0-1 | Open intermediate to 150 fms. |
|            |            |            |                 |             | Through Marshall   |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | Islands.           |           |    |    |                  |          |     |                               |
| Hy. 3984   | 222        | 222        | Jan. 18         | 12.41 p. m. | Ent. South Pass,   |           | 82 | 81 | 746              | ENE      | 2   | Do.                           |
|            |            |            |                 |             | Rongelab, N.       |           |    |    |                  |          |     |                               |
|            |            |            |                 |             | 1.5 m.             |           |    |    |                  |          |     |                               |
| Hy. 3984   | 222        | 222        | Jan. 18         | 12.45 p. m. | do                 |           | 81 | 81 | 746              | ENE      | 2   | Surface 15 minutes.           |



## Record of surface and intermediate tow-net stations (off Japan), 1900.

| Serial No. | Date.  | Time.     | Position.                                 |           | Temperatures. |               |              | Depth.        | Character of bot-<br>tom. | Remarks.   |
|------------|--------|-----------|---|-----------|---------------|---------------|--------------|---------------|---------------------------|--|
|            |        |           | Lat. N.                                   | Long. E.  | Air.          | Sur-<br>face. | Bot-<br>tom. |               |                           |  |
|            |        |           | <i>Suruga Gulf, Honshu Island, Japan.</i> |           |               |               |              |               |                           |  |
|            | 1900.  |           | ° ' "   ° ' "                             |           | ° F.          | ° F.          | ° F.         | <i>Fms.</i>   |                           |  |
| 3705 Dr    | May 7  | 1.10 p.m. | 34 49 15                                  | 138 34 45 | 64            | 64            |              | Did not sound |                           | Open intermediate; 20 minutes at 106 fathoms.            |
|            | May 7  | 1.13 p.m. | Seno Umi, S. 18°                          |           |               |               |              |               |                           | Surface; 23 minutes.                                     |
|            |        |           | W., 5.3 m.                                |           |               |               |              |               |                           |  |
| 3712 Dr    | May 10 | 4.09 p.m. | 35 03 30                                  | 138 38 50 | 65            | 64            |              | 500           |                           | Surface; 27 minutes; poor haul.                          |
|            | May 10 | 4.17 p.m. | Oze Zaki, S. 72° E., 6½ m.                |           | 59            | 65            |              | 600           |                           | Open intermediate; 19 minutes at 250 fathoms; good haul. |
|            |        |           | <i>South coast Honshu Island, Japan.</i>  |           |               |               |              |               |                           |  |
| 3730 Dr    | May 16 | 8.31 a.m. | Omai Zaki Light, N. 17° E., 14.5.         |           | 61            | 64            |              |               |                           | Surface; 22 minutes.                                     |
|            |        |           | <i>East coast Honshu Island, Japan.</i>   |           |               |               |              |               |                           |  |
| 3766 Dr    | June 3 | 3.08 p.m. | 36 36 00   143 12 00                      |           | 70            | 69            |              | Did not sound |                           | Surface; 22 minutes; excellent haul.                     |
|            |        |           | { Shiota Saki Lt., N. 78° W., 108 m.      |           |               |               |              |               |                           |  |

## MISCELLANEOUS RECORDS.

Record of gill-net stations of the Albatross, 1897.

| Serial No. | Date.           | Position.                                 |                         | Temperature. |          |         | Depth. | Character of bottom. | Nets set. |               |                         |
|------------|-----------------|---|-------------------------|--------------|----------|---------|--------|----------------------|-----------|---------------|-------------------------|
|            |                 | Lat. N.                                   | Long. W.                | Air.         | Surface. | Bottom. |        |                      | Hours.    | Number.       | Kind.                   |
|            |                 | <i>Santa Catalina Island, California.</i> |                         | ° F.         | ° F.     | ° F.    | Fms.   |                      |           |               |                         |
|            | 1897.<br>Apr. 7 | 1° 3' SE.                                 | of Avalon, Dakins Cove. | 64           | 58       | -----   | 6-10   | rky.-----            | 11        | 2             | Menhaden.               |
|            | Apr. 8          | -----do                                   | -----                   | 60           | 58       | -----   | 6-10   | rky.-----            | (?)       | 2             | Do                      |
|            |                 | <i>Monterey Bay and vicinity.</i>         |                         |              |          |         |        |                      |           |               |                         |
| 1          | Apr. 13         | 36 45 15                                  | 121 53 00               | 64           | 55       | 47.7    | 68     | m. s. bldr.-----     | 70        | 2             | Cod.                    |
| 2          | Apr. 13         | 36 39 30                                  | 121 53 00               | 57           | 56       | 48.7    | 39     | gy. s. mica-----     | 19        | 2             | Salmon.                 |
| 3          | Apr. 14         | Off Pacific Grove, Point Pinos.           |                         | 60           | 57       | -----   | 5      | gy. s. rky.-----     | 13        | 2             | Do.                     |
| 4          | Apr. 16         | 36 47 00                                  | 122 10 00               | 55           | 57       | 42.7    | 278    | gy. m. fine. s.----- | 17        | { 1<br>2      | Salmon.<br>Cod.         |
| 5          | Apr. 17         | 36 43 00                                  | 122 12 00               | 57           | 55       | 37.8    | 581    | gy. m. s.-----       | 51        | { 1<br>1<br>1 | Salmon.<br>Cod<br>Cod   |
| 6          | Apr. 21         | 37 00 30                                  | 122 20 30               | 53           | 50       | -----   | 56     | gy. m. s.-----       | 48        | { 1<br>1<br>1 | Salmon.<br>Cod.<br>Cod. |
| 7          | Apr. 24         | 37 37 30                                  | 123 02 00               | 56           | 49       | 49.0    | 68     | s. co. r.-----       | 20        | { 1<br>2      | Salmon.                 |
|            |                 | <i>Flattery Bank.</i>                     |                         |              |          |         |        |                      |           |               |                         |
| 8          | May 14          | 48 21 30                                  | 124 50 15               | 53           | 48       | 45.0    | 80     | gn. m. s.-----       | 22        | { 1<br>2      | Salmon.<br>Cod.         |

April 7.—1 anchovy.

April 8.—Barren.

No. 1.—One net badly torn. 8 rockfish (*S. paucispinis*), 3 badly eaten by sea lice—skin only remaining; average length of 5 not destroyed, 26½ inches; average weight, 8 lbs.; 4 females, all with empty stomachs; 1 male with fish bones. 1 rockfish (*S. melanops*), 20 inches long, also badly eaten. 1 cultus-cod (badly eaten), 38 inches long. 3 ground sharks (2 badly eaten), 1 with beaks of large octopus in stomach. 3 dogfish.

No. 2.—Barren.

No. 3.—2 rock-bass.

No. 4.—One cod and one salmon net badly torn; 7 black cod, 3 males and 4 females; average length, 28 inches; average weight, 8½ pounds; 3 stomachs empty; others with fish bones, young shrimps, and medusa. 3 red rockfish; bodies of 2 badly eaten; the other, 19 inches, 3 pounds; male, stomach empty. 1 large flounder; 2 dog-

fish; 6 crabs; branch of cherry tree with anemone attached (preserved section with anemone.)

No. 5.—Cod net badly torn; 3 black cod; all females; average length, 30½ inches; average weight, 11½ pounds; 2 stomachs empty; 1 with small piece fishbone; ova partially developed; 9 Macruri; 8 males, 1 female; average length, 24½ inches; average weight, 2½ pounds.

No. 6.—Barren. Set from ship.

No. 7.—1 rockfish (*S. entomelas*); female; 18 inches; 3 pounds; stomach empty. 8 rockfish (*S. paucispinis*); 1 badly eaten by sea lice and slime eels; eel found in skin; of other 7, 3 were females and 4 males; average length, 27 inches; average weight, 6½ pounds; stomachs all empty; 2 black cod; 1 chimæra; 1 barndoor skate; 5 small dogfish.

No. 8.—Nets badly torn; 1 ground shark 10½ feet long; several dogfish; 1 flounder; 1 black cod.

Record of dip-net trials with electric light.

| Date.   | Time.        | Position.                              | Length of trial. | State of sea. | Temperature. |              |
|---------|--------------|--|------------------|---------------|--------------|--------------|
|         |              |  |                  |               | Air D. B.    | Sea surface. |
| 1897.   |              | <i>Santa Catalina Island, Cal.</i>     |                  |               | ° F.         | ° F.         |
| Apr. 6  | 8 p. m ----  | Anchorage, Isthmus Cove-----           | 1 hour-----      | Smooth--      | 60           | 56           |
| Apr. 9  | 8 p. m ----  | do-----                                | do-----          | do-----       | 70           | 58           |
|         |              | <i>Monterey Bay and vicinity, Cal.</i> |                  |               |              |              |
| Apr. 12 | 7.30 p. m.-- | Anchorage, Santa Cruz-----             | 1½ hours-----    | Smooth--      | 59           | 54           |
| Apr. 23 | 8 p. m ----  | Anchorage, Halfmoon Bay-----           | 1 hour-----      | Light----     | 55           | 49           |

April 6.—Quantity of minute crustacea, medusæ, and marine refuse. One worm.

April 9.—Several annelids. Quantity of minute crustacea and marine refuse.

April 12.—1 small fish.

April 23.—Many young fishes, thought to be anchovies and sand launces; 4 very tiny fishes; 3 young shrimps; many minute crustacea; large crustacean like a centipede; several minute worms.



|    |    |    |    |    |    |    |       |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |    |    |    |    |     |     |     |    |     |     |    |    |    |    |    |
|----|----|----|----|----|----|----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|-----|-----|-----|----|-----|-----|----|----|----|----|----|
| 2  | 41 | 53 | 00 | 65 | 35 | 00 | 838   | 70  | 56  | 56  | 56  | 59  | 54½ | 48½ | 67  | 52  | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 3  | 41 | 40 | 30 | 65 | 35 | 00 | 855   | 58  | 58  | 67½ | 67½ | 67½ | 61  | 47  | 52  | 52  | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 4  | 41 | 13 | 00 | 66 | 19 | 50 | 75    | 60  | 67½ | 67½ | 67½ | 68½ | 61  | 47  | 52  | 52  | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 20 | 40 | 06 | 50 | 70 | 34 | 15 | 65    | 71  | 67  | 58  | 68  | 69½ | 68½ | 61  | 47  | 52  | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 20 | 40 | 01 | 50 | 70 | 39 | 20 | 111   | 70  | 68  | 68  | 68  | 68  | 68  | 61  | 47  | 52  | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 21 | 39 | 42 | 50 | 71 | 01 | 20 | 1,000 | 75  | 69  | 68  | 68  | 68  | 68  | 61  | 47  | 52  | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 21 | 39 | 44 | 30 | 71 | 04 | 00 | 1,022 | 70  | 68  | 68  | 68  | 67½ | 67  | 47½ | 51  | 52½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 21 | 39 | 29 | 00 | 70 | 58 | 40 | 1,842 | 71½ | 69½ | 67  | 68  | 67  | 66  | 66  | 55½ | 65½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 30 | 39 | 22 | 20 | 70 | 52 | 20 | 1,451 | 70  | 69  | 67½ | 67½ | 67  | 66  | 66  | 55½ | 65½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 1  | 37 | 56 | 20 | 70 | 57 | 30 | 1,917 | 73  | 72½ | 68  | 68  | 67  | 66  | 66  | 55½ | 65½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 1  | 37 | 40 | 30 | 70 | 37 | 30 | 2,221 | 73  | 72½ | 68  | 68  | 67  | 66  | 66  | 55½ | 65½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 2  | 37 | 12 | 20 | 69 | 39 | 00 | 2,949 | 71  | 82  | 72  | 68  | 67  | 66  | 66  | 55½ | 65½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 3  | 39 | 18 | 30 | 68 | 24 | 00 | 1,686 | 61  | 67  | 69  | 68  | 67  | 66  | 66  | 55½ | 65½ | 53½ | 47  | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 5  | 38 | 44 | 00 | 72 | 38 | 00 | 1,209 | 64  | 62½ | 62  | 61½ | 61  | 60  | 60  | 59  | 55  | 53½ | 48½ | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 5  | 38 | 48 | 00 | 72 | 40 | 30 | 1,991 | 60  | 61  | 62  | 62  | 62  | 62  | 62  | 59  | 55  | 53½ | 48½ | 40½ | 40  | 39½ | 39  | 38½ | 37½ | 39 | 39 | 45 | 50 | 49 | 39  | 38½ | 37½ | 37 | 39  | 41½ | 37 | 66 | 74 | 52 | 56 |
| 6  | 37 | 34 | 48 | 73 | 03 | 15 | 1,542 | 62  | 62  | 62  | 62  | 62  | 62  | 62  | 54  | 39½ | 51½ | 43½ | 41  | 39½ | 39  | 38½ | 37½ | 39  | 39 | 45 | 50 | 49 | 39 | 38½ | 37½ | 37  | 39 | 41½ | 37  | 66 | 74 | 52 | 56 |    |
| 9  | 35 | 16 | 20 | 75 | 02 | 30 | 48    | 76  | 78½ | 77  | 78  | 77  | 75  | 75  | 68½ | 68½ | 69  | 45  | 41  | 40  | 39  | 38½ | 37½ | 39  | 39 | 45 | 50 | 49 | 39 | 38½ | 37½ | 37  | 39 | 41½ | 37  | 66 | 74 | 52 | 56 |    |
| 9  | 35 | 16 | 20 | 75 | 04 | 00 | 34    | 75  | 77  | 77  | 78  | 77  | 75  | 75  | 68½ | 68½ | 69  | 45  | 41  | 40  | 39  | 38½ | 37½ | 39  | 39 | 45 | 50 | 49 | 39 | 38½ | 37½ | 37  | 39 | 41½ | 37  | 66 | 74 | 52 | 56 |    |
| 9  | 35 | 14 | 30 | 74 | 28 | 45 | 102   | 74  | 76  | 77  | 77  | 77  | 77  | 77  | 68½ | 68½ | 69  | 45  | 41  | 40  | 39  | 38½ | 37½ | 39  | 39 | 45 | 50 | 49 | 39 | 38½ | 37½ | 37  | 39 | 41½ | 37  | 66 | 74 | 52 | 56 |    |
| 11 | 35 | 44 | 30 | 74 | 28 | 45 | 1,066 | 76  | 76½ | 77  | 77  | 77  | 77  | 77  | 68½ | 68½ | 69  | 45  | 41  | 40  | 39  | 38½ | 37½ | 39  | 39 | 45 | 50 | 49 | 39 | 38½ | 37½ | 37  | 39 | 41½ | 37  | 66 | 74 | 52 | 56 |    |
| 12 | 36 | 16 | 15 | 74 | 51 | 20 | 40    | 65  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68  | 68 | 68 | 68 | 68 | 68 | 68  | 68  | 68  | 68 | 68  | 68  | 68 | 68 | 68 | 68 |    |

Oct.

Nov.

Oct.

Nov.

## Record of serial temperatures, 1884.

| Serial No. | Date.   | Position. |          | Depth. | Temperature. |          |             |             |              |              |              |              |              |              |              |              |              |                |                |         |
|------------|---------|-----------|----------|--------|--------------|----------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|----------------|---------|
|            |         | Lat. N.   | Long. W. |        | Air.         | Surface. | 25 fathoms. | 50 fathoms. | 100 fathoms. | 200 fathoms. | 300 fathoms. | 400 fathoms. | 500 fathoms. | 600 fathoms. | 700 fathoms. | 800 fathoms. | 900 fathoms. | 1,000 fathoms. | 1,300 fathoms. | Bottom. |
|            | 1884.   | °         | '        | Fms.   | ° F.         | ° F.     | ° F.        | ° F.        | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.           | ° F.           | ° F.    |
| Hyd. 46    | Jan. 24 | 17 51 00  | 65 08 25 | 2,423  | 80           | 77       | 77          | 77          | 77           | 60           | 51           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 39.8    |
| Hyd. 47    | Jan. 24 | 17 46 30  | 65 10 25 | 1,482  | 78           | 77       | 77          | 77          | 67           | 59           | 48           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 57    | Jan. 25 | 17 49 06  | 65 29 00 | 2,188  | 77           | 77       | 77          | 77          | 67           | 58.5         | 48           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 62    | Jan. 25 | 17 32 40  | 65 52 20 | 2,017  | 77           | 77       | 77          | 77          | 66.3         | 58.5         | 48           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 64    | Jan. 26 | 16 59 00  | 65 19 20 | 2,543  | 76           | 77       | 77          | 77          | 65.3         | 55           | 47           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 66    | Jan. 26 | 16 28 00  | 64 42 30 | 2,192  | 78           | 77       | 77          | 77          | 65           | 54.5         | 47           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 71    | Jan. 27 | 15 44 10  | 63 42 10 | 950    | 76           | 77       | 77          | 77          | 67           | 54.5         | 47           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 80    | Jan. 28 | 13 56 35  | 63 02 00 | 684    | 75           | 77       | 77          | 77          | 61           | 54.5         | 47           | 45           | 43           | 40           | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 82    | Jan. 28 | 13 29 00  | 62 42 40 | 1,051  | 80           | 77       | 77          | 77          | 68           | 50           | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 83    | Jan. 28 | 13 23 00  | 62 34 15 | 1,686  | 77           | 77       | 77          | 77          | 68.5         | 50           | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 116   | Jan. 29 | 11 48 30  | 62 17 30 | 1,140  | 75           | 77       | 77          | 77          | 75           | 50           | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 120   | Feb. 6  | 14 21 44  | 63 58 45 | 1,615  | 78           | 77       | 77          | 77          | 62           | 55           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 121   | Feb. 6  | 16 01 00  | 65 56 20 | 2,492  | 76           | 77       | 77          | 77          | 64.5         | 55           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 123   | Feb. 7  | 16 36 20  | 66 41 00 | 2,501  | 76           | 77       | 77          | 77          | 67           | 55           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 124   | Feb. 7  | 15 49 00  | 67 36 40 | 2,616  | 76           | 77       | 77          | 77          | 67           | 55           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 127   | Feb. 7  | 15 02 00  | 67 13 20 | 2,747  | 80           | 77       | 77          | 77          | 68           | 53           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 128   | Feb. 8  | 13 25 04  | 66 25 00 | 2,844  | 77           | 77       | 77          | 77          | 77.8         | 55.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 133   | Feb. 8  | 12 54 40  | 66 11 10 | 2,768  | 81           | 78       | 77.5        | 77.5        | 61.3         | 48.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 134   | Feb. 9  | 11 33 20  | 66 19 00 | 553    | 77           | 75       | 75          | 75          | 58           | 48.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 135   | Feb. 9  | 11 18 50  | 66 24 20 | 666    | 79           | 76       | 76          | 76          | 58           | 48.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 139   | Feb. 9  | 11 05 00  | 66 30 00 | 239    | 78           | 76       | 76          | 76          | 64.5         | 49.8         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 145   | Feb. 10 | 11 01 00  | 67 14 15 | 605    | 75           | 75       | 75          | 75          | 65           | 49.8         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 150   | Feb. 18 | 11 52 00  | 68 35 46 | 630    | 78           | 76       | 76          | 76          | 68.5         | 50           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 151   | Feb. 18 | 11 56 00  | 68 56 00 | 733    | 77           | 76       | 76          | 76          | 66           | 50           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 152   | Feb. 18 | 11 50 45  | 68 56 30 | 738    | 77           | 76       | 76          | 76          | 66           | 50           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 162   | Feb. 19 | 13 17 45  | 70 01 00 | 321    | 76           | 75       | 75          | 75          | 66           | 50           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 166   | Feb. 19 | 13 40 20  | 70 10 45 | 1,701  | 78           | 77       | 76          | 76          | 66.5         | 53           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 168   | Feb. 20 | 15 55 00  | 71 03 00 | 2,694  | 75           | 76       | 76          | 76          | 69           | 53           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 170   | Feb. 20 | 16 42 00  | 71 18 30 | 2,209  | 76           | 77       | 76          | 76          | 67.5         | 53           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 171   | Feb. 21 | 17 48 00  | 72 12 20 | 2,028  | 76           | 77       | 76          | 76          | 66           | 53           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 179   | Feb. 21 | 18 01 30  | 72 23 00 | 2,434  | 77           | 77       | 76          | 76          | 69           | 53           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 180   | Feb. 21 | 18 07 00  | 72 29 00 | 1,929  | 81           | 79       | 77.5        | 77.5        | 77           | 51           | 51.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40             | 40             | 38.8    |
| Hyd. 188   | Feb. 22 | 17 36 30  | 72 56 00 | 2,423  | 78           | 77       | 77          | 77          | 67           | 50           | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 190   | Feb. 22 | 17 45 30  | 73 04 00 | 2,891  | 79           | 77       | 77          | 77          | 70.5         | 51.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 190   | Feb. 23 | 17 51 40  | 74 36 30 | 894    | 75           | 77       | 77          | 77          | 75           | 51.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |
| Hyd. 190   | Feb. 23 | 17 33 30  | 74 45 00 | 955    | 78           | 77       | 77          | 77          | 77           | 51.5         | 47.8         | 45           | 43           | 40.5         | 40.5         | 40           | 40           | 40             | 40             | 38.8    |

## RECORDS OF THE ALBATROSS.

493

|           |         |          |          |           |    |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------|---------|----------|----------|-----------|----|------|------|------|------|------|------|------|------|------|------|------|------|
| Hyd. 197  | Feb. 24 | 18 45 00 | 74 32 40 | 1, 247    | 78 | 77.5 | 76   | 72   | 61   | 40.5 | 39.5 | 39.6 | 39.5 | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 198  | Feb. 24 | 18 56 00 | 74 12 00 | 1, 537    | 84 | 78   | 77.4 | 68.5 | 58   | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 199  | Feb. 24 | 18 50 00 | 73 51 00 | 1, 1974   | 80 | 79   | 77.4 | 68.2 | 54   | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 205  | Feb. 25 | 19 40 00 | 74 42 00 | 1, 923    | 77 | 78   | 74.6 | 66.7 | 54   | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 206  | Feb. 25 | 19 45 00 | 75 04 00 | 1, 639    | 78 | 77   | 77.6 | 69   | 54.2 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 215  | Feb. 25 | 19 43 21 | 75 15 30 | 1, 1, 745 | 76 | 77   | 77.6 | 71   | 51   | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 216  | Feb. 28 | 18 54 30 | 74 16 30 | 1, 486    | 77 | 78   | 78.4 | 74.4 | 52.4 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 217  | Feb. 28 | 18 32 30 | 75 06 00 | 1, 870    | 78 | 78   | 78.4 | 78.4 | 49.7 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 218  | Feb. 28 | 18 34 00 | 74 21 00 | 1, 015    | 79 | 78   | 77.8 | 68.7 | 51   | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 346  | Mar. 23 | 9 46 00  | 76 18 30 | 255       | 81 | 82   | 77.6 | 72.2 | 52.4 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 353  | Mar. 24 | 9 44 40  | 77 56 00 | 550       | 79 | 79   | 76   | 72.2 | 52.4 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 354  | Mar. 24 | 9 47 00  | 78 09 30 | 630       | 79 | 78   | 78.7 | 72.5 | 51.6 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 355  | Mar. 24 | 9 48 00  | 78 24 00 | 1, 017    | 79 | 79   | 78.7 | 72.1 | 52   | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 363  | Mar. 25 | 9 45 15  | 79 34 00 | 1, 370    | 80 | 79   | 75   | 56.5 | 51.6 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 371  | Apr. 3  | 11 20 00 | 80 42 10 | 1, 832    | 80 | 79   | 78   | 63.8 | 46.6 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 419  | Apr. 10 | 15 28 39 | 80 36 00 | 1, 653    | 79 | 78   | 78.8 | 67.9 | 47.8 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 419  | Apr. 14 | 23 48 14 | 84 06 55 | 1, 356    | 79 | 78   | 77.9 | 67.9 | 51.4 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 2172 | July 20 | 38 01 15 | 73 44 00 | 1, 568    | 76 | 76   | 58.8 | 55.4 | 40.7 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 2173 | July 21 | 37 57 00 | 72 34 00 | 1, 600    | 68 | 68   | 53   | 51.7 | 39.7 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 533  | July 23 | 39 23 45 | 71 43 00 | 992       | 70 | 69   | 57   | 50.6 | 40.6 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 544  | Aug. 3  | 39 55 00 | 71 07 00 | 221       | 71 | 68   | 64.3 | 51.8 | 40.9 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 545  | Aug. 4  | 39 47 00 | 70 16 30 | 784       | 74 | 72   | 61.1 | 52.2 | 40.9 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 2197 | Aug. 6  | 39 56 30 | 69 43 30 | 84        | 77 | 74   | 49.8 | 52.3 | 40.9 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |
| Hyd. 549  | Aug. 20 | 39 34 00 | 71 34 30 | 925       | 75 | 74   | 66.2 | 54.8 | 40.6 | 40.5 | 40.1 | 40   | 39   | 39.2 | 39.3 | 39.7 | 39.7 |



## Record of serial temperatures, 1885.

| Serial No.   | Date.   | Position. |               | Depth.   | Temperature.  |               |               |                |              |              |              |              |              |              |              |              |              |                |         |
|--------------|---------|-----------|---------------|----------|---------------|---------------|---------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|---------|
|              |         | Lat. N.   | Long. W.      |          | Air.          | Surface.      | 25 fathoms.   | 50 fathoms.    | 100 fathoms. | 200 fathoms. | 300 fathoms. | 400 fathoms. | 500 fathoms. | 600 fathoms. | 700 fathoms. | 800 fathoms. | 900 fathoms. | 1,000 fathoms. | Bottom. |
| 2393         | 1885.   |           |               | Fathoms. | ° F.          | ° F.          | ° F.          | ° F.           | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.           | ° F.    |
| Hyd. 699     | Mar. 13 | 28 43 00  | 87 14 30      | 525      | 70            | 64            | 65.2          | 64             | 57.9         | d 63.3       | 45.7         | 43           |              |              |              |              |              |                | 41      |
| Hyd. 702     | Apr. 1  | 31 54 45  | 79 17 00      | 86       | 66            | 69            | a 69.9        | b 68.4         | c 66.3       | f 59.6       | e 60.8       |              |              |              |              |              |              |                | 60.3    |
| Hyd. 703     | Apr. 3  | 36 30 00  | 73 14 00      | 2,340    | 69            | 72            |               |                |              |              |              |              |              |              |              |              |              |                | 36.8    |
| Hyd. 704     | Apr. 4  | 36 45 00  | 73 28 00      | 1,646    | 68            | 66            |               |                |              | f 43         |              |              |              |              |              |              |              |                | 37.2    |
| Hyd. 705     | Apr. 4  | 36 57 30  | 73 47 00      | 1,436    | 61            | 55            | 50.8          | 49.9           | 52.2         | 43           |              | 39.5         | 38.4         | 38.6         | 52.2         | 38.1         | 40.6         |                | 37.5    |
| Hyd. 712     | Apr. 5  | 37 01 08  | 74 10 00      | 1,208    | 50            | 52            | 50.1          | 44             | 51.3         | 44           |              | 39.7         | 39.3         | 40.8         |              |              |              |                | 38.7    |
| 2542         | Aug. 7  | 40 00 15  | 74 32 00      | 98       | 43            | 49            | 50.3          | 48.2           |              |              |              |              |              |              |              |              |              |                |         |
| Hyd. 849     | Aug. 9  | 39 49 00  | 70 42 00      | 129      | 73            | 76            | 59.8          | 56.3           | 49.8         | 44           | 40.5         |              |              |              |              |              |              |                | 47.2    |
| Hyd. 854     | Aug. 10 | 39 41 00  | 71 42 00      | 452      | 71            | 77            | 59.5          | 57             | 49.8         |              |              |              |              |              |              |              |              |                | 39.6    |
| 2564         | Aug. 11 | 39 22 00  | 71 23 30      | 378      | 76            | 77            | 62.5          | 45.8           | 49           | 42.1         | 40.1         | 40           | 39.4         | 39           | 39.2         | 38.5         | 41.3         |                | 37.3    |
| 2565         | Aug. 28 | 38 19 20  | 69 02 30      | 1,396    | 79            | 78            | 61.6          | 58.1           | 51.3         | 48.8         | 40.3         | 40.1         | 39.4         | 38.7         | 39           | 38.6         | 38.8         | 38.6           | 36.2    |
| 2566         | Aug. 29 | 37 23 00  | 68 08 00      | 2,069    | 72            | 77            | 76.8          | 73.7           | 53.1         | 54.2         | 49.9         | 49.1         | 53.7         | 45.3         | 40.7         | 40.2         | 39.5         | 39.3           | 36.4    |
| 2571         | Sept. 1 | 40 09 30  | 67 03 00      | 2,620    | 75            | 80            | 81.2          | 79.2           | 66.6         | 64.6         | 63           | 59.1         | 39.7         | 38.8         | 39.8         | 38.6         | 38.8         | 38.1           | 37.8    |
| 2573         | Sept. 2 | 40 34 18  | 66 09 00      | 1,356    | 75            | 72            | 65.7          | 60.2           | 54.8         | 45.7         | 41.8         | 40           | 39.7         | 39.1         | 39.4         | 38.6         | 38.8         | 38.1           | 37.3    |
| 2575         | Sept. 3 | 41 07 00  | 65 26 30      | 1,742    | 71            | 77            | 68.3          | 61             | 52.8         | 49.4         | 42           | 40.2         | 39.7         | 39.1         | 38.7         | 38.6         | 38.4         | 38             | 37.1    |
| 2578         | Oct. 21 | 32 24 00  | 76 55 30      | 1,710    | 64            | 77            | 71.2          | 59.1           | 52.8         | 47           | 41.3         | 40.2         | 39.8         | 39.3         | 38.7         | 38.8         | 38.4         | 38             | 38.5    |
|              |         |           |               | 528      | 70            | 77            | 79.9          | 77.6           | 59           | 48           | 45.5         | 40.2         |              |              |              |              |              |                |         |
| a 5 fathoms. |         |           | b 10 fathoms. |          | c 15 fathoms. | d 25 fathoms. | e 50 fathoms. | f 250 fathoms. |              |              |              |              |              |              |              |              |              |                |         |

α 5 fathoms.

b 10 fathoms.

c 15 fathoms.

d 25 fathoms.

e 50 fathoms.

f 250 fathoms.

| Serial No. | Date.   | Position. |          | Air. | Surface. | 3 fathoms. | 50 fathoms. | 100 fathoms. | 200 fathoms. | 300 fathoms. | 400 fathoms. | 500 fathoms. | 600 fathoms. | 700 fathoms. | 800 fathoms. | 900 fathoms. | 1,000 fathoms. | Bottom. | Depth. |
|------------|---------|-----------|----------|------|----------|------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|---------|--------|
|            |         | Lat. N.   | Long. W. |      |          |            |             |              |              |              |              |              |              |              |              |              |                |         |        |
|            | 1891.   | °         | '        | ° F. | ° F.     | ° F.       | ° F.        | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.         | ° F.           | ° F.    | Fms.   |
| Hy. 2609   | Feb. 23 | 7 12 30   | 80 56 00 | 79   | 81       | 67.2       | 63.2        | 58.5         | 52.9         | 44.9         | 48.7         | 41           | 40.2         | 38.3         | 38.9         | 37.5         | 36.5           | 36.6    | 127    |
| Dr. 3357   | Feb. 23 | 7 7 09    | 81 08 00 | 80   | 83       | 68.4       | 65.9        | 58.5         | 51.8         | 46.1         | 43           | 41           | 40.2         | 38.3         | 38.9         | 37.5         | 36.5           | 36.6    | 546    |
| Dr. 3356   | Feb. 24 | 7 6 30    | 81 44 00 | 80   | 82       | 74.4       | 76          | 55.7         | 51.8         | 46.8         | 43.6         | 41.9         | 40.2         | 38.3         | 38.9         | 37.5         | 36.5           | 36.6    | 782    |
| Dr. 3361   | Feb. 25 | 6 10 00   | 83 06 00 | 81   | 82       | 76.9       | 59          | 55.8         | 50.5         | 46.7         | 43.6         | 41.9         | 40.2         | 38.3         | 38.9         | 37.5         | 36.5           | 36.6    | 1,471  |
| Dr. 3362   | Feb. 26 | 5 56 00   | 85 10 30 | 80   | 84       | 71.8       | 71.8        | 55.8         | 51.3         | 46.7         | 43.6         | 41.9         | 40.2         | 38.3         | 38.9         | 37.5         | 36.5           | 36.6    | 1,175  |
| Dr. 3364   | Feb. 27 | 5 30 00   | 86 08 30 | 79   | 81       | 68.9       | 71.4        | 54.4         | 48.8         | 44.9         | 42.8         | 41           | 40.2         | 38.3         | 38.9         | 37.5         | 36.5           | 36.6    | 902    |
| Dr. 3366   | Feb. 28 | 5 31 00   | 86 45 00 | 83   | 84       | 73.7       | 58.9        | 55.8         | 50.9         | 45.9         | 44.7         | 41.5         | 40.4         | 38.8         | 38.8         | 37.5         | 36.5           | 36.6    | 1,067  |
| Dr. 3367   | Feb. 28 | 5 30 00   | 86 52 30 | 81   | 82       | 72.4       | 69          | 55.8         | 50.9         | 45.9         | 44.7         | 41.5         | 40.4         | 38.8         | 38.8         | 37.5         | 36.5           | 36.6    | 1,100  |
| Dr. 3372   | Mar. 1  | 4 49 00   | 86 11 20 | 85   | 84       | 74.4       | 58.8        | 55           | 49.1         | 44.9         | 42.5         | 41           | 40.2         | 38.8         | 38.8         | 37.5         | 36.5           | 36.6    | 761    |
| Dr. 3373   | Mar. 2  | 4 02 00   | 84 58 00 | 83   | 82       | 77.7       | 60.9        | 55.9         | 49.7         | 44.4         | 41.9         | 40.9         | 39.4         | 38           | 37.5         | 37.1         | 37             | 36.4    | 1,877  |
| Dr. 3374   | Mar. 3  | 2 35 00   | 83 53 00 | 81   | 80       | 74.8       | 61.1        | 56.6         | 51.3         | 45.8         | 42.3         | 40.9         | 39.4         | 38.9         | 38.9         | 37.6         | 37.2           | 36.6    | 1,823  |
| Dr. 3375   | Mar. 4  | 2 34 00   | 82 29 00 | 76   | 77       | 66.7       | 58          | 58           | 54.2         | 46.6         | 43.8         | 40.9         | 39.9         | 38.9         | 38           | 37.6         | 37.2           | 36.6    | 1,201  |
| Hy. 2613   | Mar. 5  | 3 50 00   | 81 44 20 | 77   | 77       | 69.9       | 59.9        | 57.7         | 50.8         | 45.6         | 43.3         | 40.9         | 39.4         | 38.8         | 37.7         | 37.4         | 36.6           | 35.8    | 1,181  |
| Dr. 3381   | Mar. 6  | 4 56 00   | 80 52 30 | 78   | 77       | 70.9       | 59.3        | 55.4         | 51.5         | 46.7         | 42.8         | 40.5         | 39.4         | 38.6         | 38.1         | 36.7         | 36.3           | 35.8    | 1,772  |
| Dr. 3382   | Mar. 7  | 6 21 00   | 81 41 00 | 77   | 75       | 67.7       | 61.1        | 55.3         | 49.9         | 45.8         | 42.8         | 41.1         | 39.4         | 38.8         | 39           | 37.4         | 37             | 35.8    | 1,793  |
| Dr. 3383   | Mar. 8  | 7 21 00   | 79 02 00 | 75   | 74       | 63.2       | 63.4        | 56.4         | 49.1         | 45.0         | 43.3         | 41.3         | 39.6         | 39.4         | 39           | 37.4         | 37             | 35.8    | 1,832  |
| Dr. 3387   | Mar. 8  | 7 40 00   | 79 17 50 | 77   | 74       | 65.8       | 64          | 56.1         | 49           | 45.5         | 43.4         | 43.1         | 41.9         | 39.2         | 38.1         | 37.7         | 37.2           | 36      | 127    |
| Dr. 3388   | Mar. 9  | 7 06 00   | 79 48 00 | 75   | 73       | 64         | 60.9        | 56.1         | 49           | 45.5         | 43.4         | 43.1         | 41.9         | 39.2         | 38.1         | 37.7         | 37.2           | 36.2    | 1,168  |
| Dr. 3392   | Mar. 10 | 7 05 30   | 79 40 00 | 76   | 73       | 63         | 63          | 55.9         | 49.8         | 45           | 43.2         | 40.5         | 39.7         | 38.6         | 39.5         | 37.3         | 36.8           | 36.4    | 1,270  |
| Hy. 2619   | Mar. 11 | 7 31 00   | 78 42 30 | 72   | 68       | 65         | 61.8        | 61.3         | 48.9         | 45.5         | 42.6         | 41.1         | 40.2         | 38.7         | 37.8         | 37.3         | 36.5           | 36.5    | 1,100  |
| Dr. 3396   | Mar. 11 | 7 32 00   | 78 36 30 | 77   | 70       | 64.5       | 62.4        | 55.9         | 56.4         | 45.6         | 43.1         | 41.9         | 41           | 39.7         | 38.7         | 37.7         | 37.1           | 36.5    | 259    |
| Hy. 2624   | Mar. 11 | 1 18 00   | 80 01 00 | 77   | 80       | 68.9       | 59.1        | 58.1         | 56.4         | 45.6         | 43.1         | 41.9         | 41           | 39.7         | 38.7         | 37.7         | 37.1           | 36      | 724    |
| Hy. 2626   | Mar. 23 | 1 07 00   | 79 59 00 | 79   | 80       | 68.9       | 60.7        | 58.1         | 56.4         | 45.6         | 43.1         | 41.9         | 41           | 39.7         | 38.7         | 37.7         | 37.1           | 36      | 90     |
| Dr. 3398   | Mar. 23 | 1 07 00   | 80 21 00 | 84   | 84       | 68.8       | 64.4        | 59           | 53.8         | 45.1         | 42.9         | 42           | 40.3         | 39.5         | 38.4         | 38           | 37             | 36      | 1,573  |
| Dr. 3399   | Mar. 24 | 1 07 00   | 81 04 00 | 79   | 83       | 72.7       | 65.7        | 56.1         | 50           | 44.9         | 43           | 41.4         | 40.3         | 38.9         | 38           | 37.6         | 36.7           | 36      | 1,740  |
| Hy. 2627   | Mar. 25 | 0 36 00   | 82 45 00 | 80   | 81       | 71.4       | 64.3        | 56.8         | 49.2         | 44.8         | 42.5         | 41.9         | 40.2         | 38.7         | 38.2         | 37.7         | 37.1           | 36      | 1,832  |
| Hy. 2629   | Mar. 26 | 0 20 00   | 85 08 00 | 85   | 83       | 69.9       | 63.7        | 56.2         | 50.1         | 45           | 42.4         | 41.8         | 40.3         | 39.2         | 38.6         | 37.8         | 36.8           | 36      | 1,488  |
| Dr. 3401   | Mar. 28 | 0 59 00   | 88 58 30 | 81   | 82       | 70.1       | 63.7        | 56.6         | 50           | 46.1         | 42.3         | 41.8         | 40.3         | 39.2         | 38.6         | 37.8         | 36.8           | 43.8    | 395    |
| Dr. 3406   | Apr. 3  | 0 16 00   | 90 21 30 | 79   | 81       | 73.5       | 59.9        | 57.9         | 53.9         | 45           | 42.3         | 41.8         | 40.3         | 39.2         | 38.6         | 37.8         | 36.8           | 41.3    | 551    |
| Dr. 3411   | Apr. 4  | 0 54 00   | 91 09 00 | 79   | 82       | 71.8       | 67.8        | 61.5         | 54           | 46.8         | 43           | 41.3         | 40.8         | 39.8         | 38.9         | 38.1         | 37.5           | 36.2    | 1,189  |
| Dr. 3414   | Apr. 8  | 10 14 00  | 96 28 00 | 81   | 82       | 81.9       | 72.1        | 59.5         | 51.8         | 47.8         | 44.4         | 42           | 40.8         | 39.6         | 38.8         | 38.1         | 37.3           | 35.8    | 2,232  |

## Record of serial temperatures, 1893.

| No. of station. | Date. | Depth. | Position. |          | Air. | Surface. | Bottom. | Temperature. |    |    |    |    |    |    |    |    |    |    |    |     |     |     |     |     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|-----------------|-------|--------|-----------|----------|------|----------|---------|--------------|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                 |       |        | Lat. N.   | Long. W. |      |          |         | fathoms.     | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 200 | 300 | 400 | 500 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|                 | 1893. | Fms.   | °         | '        | °    | '        | °       | '            | °  | '  | °  | '  | °  | '  | °  | '  | °  | '  | °  | '   | °   | '   | °   | '   | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° | ' | ° |

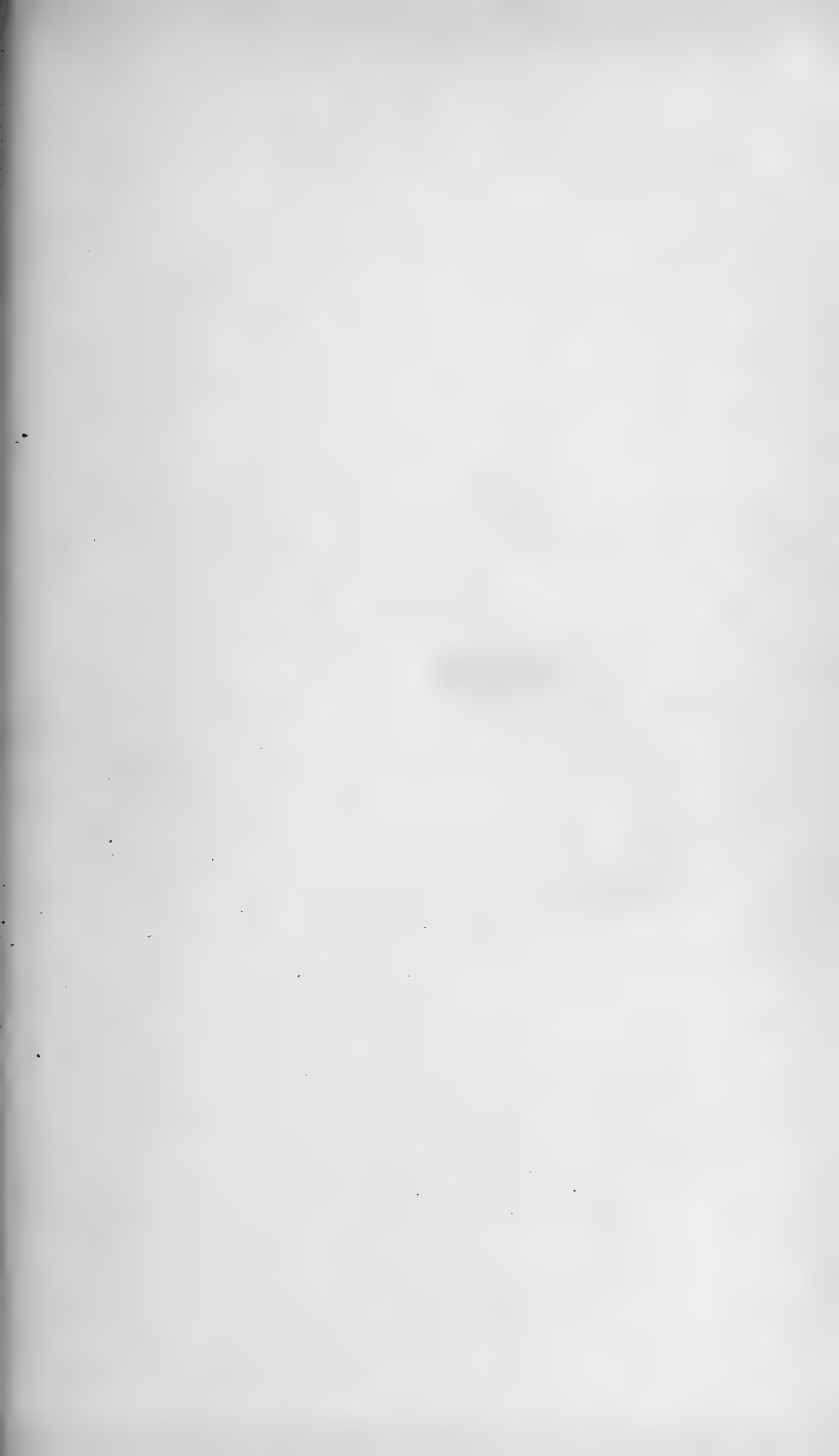
|          |      |    |       |    |    |    |     |    |    |    |    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |    |
|----------|------|----|-------|----|----|----|-----|----|----|----|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----|----|
| Dr. 3517 | Aug. | 2  | 24    | 60 | 27 | 00 | 169 | 04 | 00 | 41 | 41 | 40.3 | 41.8 | 41.8 | 41.1 | 81   | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45 | 46 |
| Hy. 3347 | Aug. | 2  | 27    | 60 | 26 | 00 | 169 | 54 | 00 | 41 | 41 | 35.3 | 41.8 | 41.8 | 41.8 | 81   | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45 | 46 |
| Hy. 3348 | Aug. | 3  | 35    | 60 | 24 | 00 | 170 | 48 | 00 | 42 | 42 | 32.9 | 42   | 42   | 41.7 | 81   | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45 | 46 |
| Dr. 3518 | Aug. | 3  | 36    | 60 | 22 | 00 | 171 | 42 | 00 | 41 | 42 | 33.9 | 41.7 | 41.7 | 41.8 | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3519 | Aug. | 3  | 37    | 60 | 06 | 30 | 171 | 25 | 00 | 43 | 42 | 31.8 | 43   | 42.6 | 40.8 | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3349 | Aug. | 3  | 38    | 59 | 47 | 00 | 171 | 08 | 00 | 43 | 43 | 31.8 | 43   | 42.6 | 40.8 | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3520 | Aug. | 3  | 38    | 59 | 28 | 00 | 170 | 57 | 00 | 43 | 43 | 32.2 | 42.6 | 42.6 | 39.1 | 29.8 | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3521 | Aug. | 3  | 40    | 58 | 52 | 00 | 170 | 48 | 00 | 45 | 44 | 30.8 | 43.2 | 42.8 | 42.8 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3350 | Aug. | 3  | 40    | 58 | 52 | 00 | 170 | 38 | 00 | 45 | 44 | 35.4 | 43.1 | 41.1 | 41.1 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3352 | Aug. | 4  | 41    | 57 | 15 | 00 | 170 | 18 | 00 | 46 | 44 | 35.7 | 44   | 44   | 44   | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3522 | Aug. | 4  | 41    | 57 | 39 | 00 | 170 | 02 | 00 | 46 | 45 | 38   | 44   | 44.5 | 44   | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3523 | Aug. | 4  | 39    | 57 | 39 | 00 | 169 | 56 | 00 | 47 | 45 | 40.3 | 44   | 44.5 | 44   | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3524 | Aug. | 4  | 36    | 57 | 24 | 00 | 170 | 05 | 00 | 46 | 45 | 41.6 | 43   | 43.3 | 42.9 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3525 | Aug. | 4  | 29    | 57 | 21 | 00 | 170 | 05 | 00 | 47 | 44 | 40.3 | 43.3 | 42.9 | 42.9 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3526 | Aug. | 5  | 37    | 57 | 24 | 00 | 170 | 24 | 00 | 47 | 44 | 38.9 | 44.2 | 43.9 | 43.9 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3527 | Aug. | 5  | 49    | 57 | 31 | 00 | 170 | 57 | 00 | 47 | 44 | 38.9 | 44.2 | 43.9 | 43.9 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3528 | Aug. | 5  | 52    | 57 | 48 | 00 | 171 | 21 | 00 | 48 | 44 | 38   | 45   | 45   | 45   | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3529 | Aug. | 5  | 55    | 58 | 04 | 00 | 171 | 41 | 00 | 48 | 45 | 37.4 | 44.8 | 44.4 | 44.4 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3530 | Aug. | 5  | 55    | 58 | 19 | 30 | 172 | 02 | 00 | 47 | 45 | 35.9 | 45.6 | 45.2 | 44.5 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3531 | Aug. | 5  | 56    | 58 | 36 | 00 | 172 | 24 | 00 | 46 | 45 | 36.1 | 45.2 | 44.5 | 44.5 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3355 | Aug. | 5  | 57    | 58 | 52 | 00 | 172 | 45 | 00 | 46 | 44 | 35.3 | 45.2 | 44.2 | 44.2 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3356 | Aug. | 6  | 57    | 59 | 09 | 00 | 173 | 09 | 00 | 45 | 44 | 34.2 | 43.3 | 43.2 | 43.2 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3357 | Aug. | 6  | 57    | 59 | 24 | 00 | 173 | 31 | 00 | 45 | 44 | 35.7 | 44.3 | 44.3 | 41.8 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3530 | Aug. | 6  | 59    | 59 | 39 | 00 | 173 | 53 | 00 | 45 | 44 | 34.9 | 44.3 | 44.3 | 43   | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3531 | Aug. | 6  | 59    | 59 | 55 | 00 | 174 | 17 | 00 | 47 | 46 | 35.1 | 43.5 | 43.4 | 43.4 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3358 | Aug. | 6  | 70    | 59 | 33 | 00 | 175 | 00 | 00 | 51 | 46 | 33.6 | 44.8 | 44.8 | 42.9 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3532 | Aug. | 6  | 71    | 58 | 43 | 00 | 176 | 10 | 00 | 44 | 44 | 34.8 | 44.6 | 44.6 | 42.9 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3359 | Aug. | 7  | 1,744 | 58 | 11 | 00 | 176 | 38 | 00 | 45 | 44 | 35.5 | 45.1 | 45.1 | 45   | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3360 | Aug. | 7  | 1,367 | 58 | 01 | 00 | 175 | 41 | 00 | 48 | 46 | 35.2 | 46.7 | 46.7 | 45.8 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3362 | Aug. | 7  | 77    | 57 | 41 | 00 | 174 | 05 | 00 | 49 | 47 | 38   | 46   | 46   | 45.5 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3533 | Aug. | 7  | 70    | 57 | 34 | 00 | 173 | 33 | 00 | 47 | 46 | 39.2 | 45.9 | 45.9 | 45.3 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3363 | Aug. | 7  | 69    | 57 | 25 | 00 | 172 | 50 | 00 | 47 | 45 | 37.8 | 46.1 | 46.1 | 45.3 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3364 | Aug. | 8  | 60    | 57 | 08 | 00 | 171 | 38 | 00 | 47 | 45 | 37.8 | 44.4 | 44.4 | 46.1 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3534 | Aug. | 8  | 59    | 57 | 03 | 00 | 171 | 19 | 00 | 47 | 45 | 38.1 | 45.3 | 45.3 | 46.1 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3535 | Aug. | 8  | 52    | 57 | 02 | 00 | 170 | 46 | 00 | 48 | 45 | 39   | 43.4 | 43.5 | 42.5 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3536 | Aug. | 8  | 40    | 57 | 05 | 00 | 170 | 35 | 00 | 48 | 45 | 42.4 | 43.4 | 42.5 | 42.5 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3537 | Aug. | 9  | 37    | 56 | 49 | 00 | 169 | 42 | 00 | 46 | 44 | 40.9 | 44.1 | 44.1 | 42.5 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3538 | Aug. | 9  | 49    | 54 | 45 | 00 | 169 | 06 | 00 | 45 | 43 | 38   | 45.6 | 45.6 | 45.2 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3539 | Aug. | 9  | 59    | 56 | 41 | 00 | 168 | 29 | 00 | 48 | 46 | 38   | 45.5 | 45.4 | 45.4 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3366 | Aug. | 9  | 59    | 56 | 37 | 00 | 167 | 55 | 00 | 49 | 46 | 38   | 45.9 | 45.9 | 45.4 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3540 | Aug. | 9  | 57    | 56 | 34 | 00 | 167 | 19 | 00 | 49 | 46 | 38.9 | 46.2 | 46.2 | 46.7 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3367 | Aug. | 9  | 55    | 56 | 31 | 00 | 166 | 43 | 00 | 48 | 45 | 37.5 | 46.5 | 46.5 | 46.6 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3541 | Aug. | 10 | 51    | 56 | 27 | 00 | 166 | 08 | 00 | 47 | 45 | 36.1 | 46.4 | 46.4 | 46.6 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3542 | Aug. | 10 | 49    | 56 | 14 | 00 | 164 | 08 | 00 | 48 | 46 | 36.1 | 46.9 | 47.2 | 47.2 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Hy. 3385 | Aug. | 18 | 49    | 56 | 10 | 00 | 163 | 26 | 00 | 49 | 47 | 36.2 | 47   | 47   | 48.2 | 40   | 32   | 37.9 | 39.1 | 37.2 | 35.5 | 35.2 | 38.1 | 38.1 | 38.1 | 38.4 | 38   | 38.4 | 46.6 | 42.4 | 45   | 46 |    |
| Dr. 3543 | Aug. | 18 | 1,036 | 55 | 50 | 00 |     |    |    |    |    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |    |    |

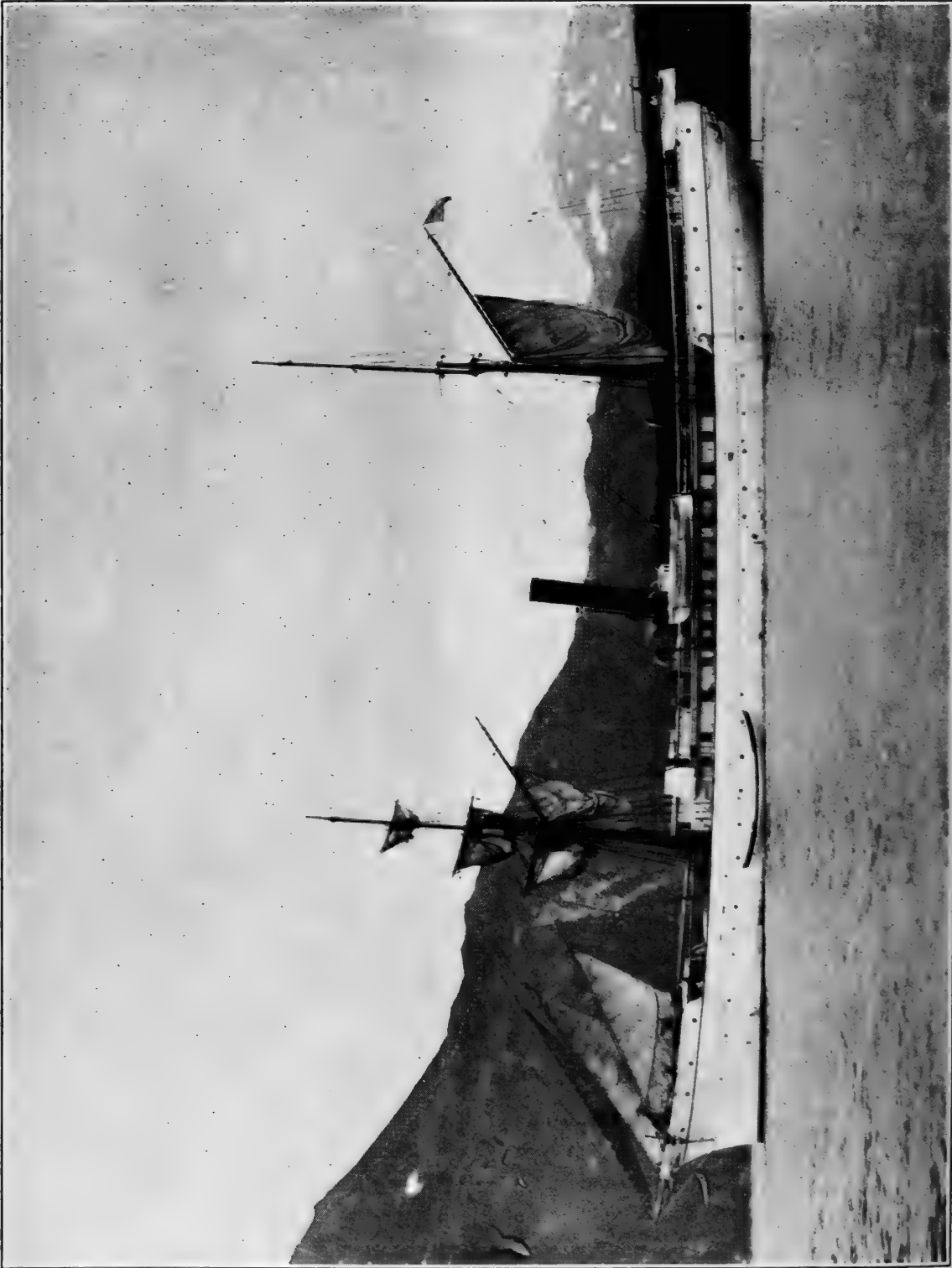


| No. of station.  | Date.    | Position. |          | Depth. | Temperature. |          |         |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |       |
|--|----------|-----------|----------|--------|--------------|----------|---------|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
|  |          | Lat. N.   | Long. W. |        | Air, D. B.   | Surface. | Bottom. | 5 feet. | 3    | 10   | 25   | 30   | 50   | 100  | 150  | 200  | 300  | 400  | 500  | 600  | 700  | 800  | 900  | 1,000 |
| Hy. 3589<br>Hy. 3590<br>Hy. 3591<br>Dr. 3601<br>Hy. 3592<br>Hy. 3593<br>Int. 47<br>Hy. 3594<br>Hy. 3595<br>Hy. 3596<br>Int. 49<br>Int. 50<br>Hy. 3597<br>Int. 52<br>Hy. 3598<br>Hy. 3599<br>Hy. 3600<br>Hy. 3601<br>Hy. 3602<br>Dr. 3603 | 1895. 4  | °         | '        | Fms.   | ° F.         | ° F.     | ° F.    | ° F.    | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F. | ° F.  |
|  | Aug. 5   | 54 00     | 169 20   | 1,003  | 45           | 45       | 35.5    | 46      | 45.3 | 45   | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5  |
|  | Aug. 5   | 54 30     | 169 31   | 1,491  | 44           | 45       | 35.5    | 45      | 44.8 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5 | 44.5  |
|  | Aug. 5   | 54 59     | 169 41   | 1,676  | 46           | 46       | 35      | 46      | 45   | 42.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.2 | 38.2 | 37.5 | 37.6 | 37.1 | 36.2 | 36.7 | 35.7 | 35.7  |
|  | Aug. 5   | 55 06     | 169 08   | 1,044  | 46           | 46       | 35.2    | 46      | 45.5 | 44.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.2 | 38.2 | 37.5 | 37.6 | 37.1 | 36.2 | 36.7 | 35.7 | 35.7  |
|  | Aug. 5   | 55 12     | 168 47   | 1,035  | 46           | 44       | 35.2    | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.2 | 38.2 | 37.5 | 37.6 | 37.1 | 36.2 | 36.7 | 35.7 | 35.7  |
|  | Aug. 6   | 55 34     | 169 22   | 1,315  | 46           | 44       | 34.7    | 45      | 44.8 | 43.3 | 37.8 | 37.8 | 37.2 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 7   | 55 36     | 170 45   | 1,664  | 45           | 44       | 34.7    | 45      | 44.4 | 43.3 | 37.8 | 37.8 | 37.2 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 7   | 55 10     | 170 56   | 1,664  | 45           | 44       | 34.7    | 45      | 44.4 | 43.3 | 37.8 | 37.8 | 37.2 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 8   | 55 12     | 171 48   | 1,819  | 44           | 45       | 35.2    | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 8   | 55 32     | 172 17   | 1,901  | 44           | 45       | 35.2    | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 8   | 55 53     | 171 40   | 1,901  | 44           | 45       | 35.2    | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 8   | 55 44     | 171 17   | 1,267  | 44           | 45       | 35.2    | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 10  | 56 15     | 172 35   | 1,267  | 46           | 45       | 36      | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 10  | 56 13     | 172 20   | 296    | 46           | 45       | 36      | 45      | 44.5 | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 10  | 56 28     | 172 39   | 200    | 45           | 44       | 38.1    | 45      | 44   | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 10  | 56 29     | 172 39   | 200    | 45           | 45       | 38.1    | 45      | 44   | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 10  | 56 30     | 172 40   | 156    | 45           | 45       | 37.1    | 45      | 43.8 | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
|  | Aug. 10  | 56 31     | 172 40   | 110    | 45           | 44       | 37.1    | 45      | 44   | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 10  | 56 32    | 172 40    | 81       | 45     | 44           | 37.1     | 45      | 43.8    | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 11  | 55 23    | 170 31    | 1,771    | 46     | 45           | 35.1     | 45      | 44.3    | 44   | 43.8 | 44.5 | 44.5 | 38.1 | 36   | 36   | 38.3 | 38.4 | 38.1 | 37.5 | 37.2 | 35.9 | 36.1 | 35.6 | 35.8  |
| Aug. 11  | 55 10    | 170 25    | 1,771    | 45     | 45           | 35.1     | 45      | 44.3    | 44   | 43.8 | 44.5 | 44.5 | 38.1 | 36   | 36   | 38.3 | 38.4 | 38.1 | 37.5 | 37.2 | 35.9 | 36.1 | 35.6 | 35.8  |
| Aug. 11  | 54 56    | 170 16    | 1,025    | 46     | 45           | 35.3     | 45      | 44      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 12  | 54 39    | 170 19    | 1,025    | 46     | 44           | 35.3     | 45      | 44      | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 12  | 54 46    | 169 29    | 1,355    | 45     | 44           | 35.2     | 45      | 44.8    | 44   | 43.8 | 44.5 | 44.5 | 38.1 | 36   | 36   | 38.3 | 38.4 | 38.1 | 37.5 | 37.2 | 35.9 | 36.1 | 35.6 | 35.8  |
| Aug. 12  | 54 54    | 168 59    | 1,401    | 46     | 45           | 35.2     | 45      | 45      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 12  | 55 01    | 168 33    | 1,162    | 44     | 45           | 35.1     | 45      | 45      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 13  | 54 54    | 168 13    | 1,132    | 44     | 44           | 35.5     | 45      | 44      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 13  | 54 41    | 168 01    | 823      | 44     | 45           | 35.3     | 45      | 44      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 13  | 54 41    | 168 25    | 1,122    | 44     | 45           | 35.3     | 45      | 44      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 13  | 55 09    | 167 40    | 189      | 45     | 45           | 37.5     | 45      | 44      | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 13  | 55 17    | 167 34    | 91       | 45     | 44           | 37.5     | 45      | 44      | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 |       |
| Aug. 13  | 55 27    | 167 47    | 87       | 46     | 45           | 38.1     | 45      | 44      | 43.5 | 42.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 13  | 55 32    | 168 11    | 83       | 45     | 45           | 38.9     | 44      | 43.8    | 43   | 42.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 13  | 55 42    | 168 32    | 76       | 45     | 45           | 38.3     | 45      | 43.8    | 44   | 43.8 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 18  | 54 14    | 166 54    | 778      | 52     | 46           | 36.3     | 45      | 44      | 43.3 | 40.1 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5 | 35.7  |
| Aug. 18  | 54 25    | 167 13    | 384      | 50     | 46           | 38.1     | 45      | 44.8    | 44   | 43.5 | 42.8 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 18  | 54 11 30 | 167 25    | 987      | 46     | 46           | 35.9     | 45      | 44.3    | 44   | 43.5 | 42.8 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 18  | 54 25    | 167 38    | 486      | 45     | 46           | 37.1     | 45      | 44.3    | 44   | 43.5 | 42.8 | 40.1 | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 19  | 54 11 30 | 167 50    | 1,048    | 45     | 42           | 35.2     | 44      | 43.3    | 42   | 42   | 42   | 40   | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |
| Aug. 19  | 54 24    | 168 02    | 1,538    | 44     | 42           | 37.1     | 44      | 43      | 41.8 | 42   | 42   | 40   | 38.1 | 37.1 | 37.1 | 38.6 | 38.1 | 38.3 | 37.8 | 37.1 | 36.7 | 35.9 | 36.7 | 35.5  |









THE ALBATROSS

# CHRONOLOGICAL BIBLIOGRAPHY RELATIVE TO THE WORK OF THE ALBATROSS.

1.

1884. GILL, THEODORE. Diagnoses of new genera and species of deep-sea fish-like vertebrates.

*Proc. U. S. Nat. Mus.* 1883, vol. 6, pp. 253-260.

The new genera and species described are as follows: *Histiobranchus*, *Sigmops*, *Hyperchoristus*, *Plectromus*, *Stephanoberyx*, *Caulolepis*, *Bassozetus*, *Petromyzon bairdii*, *Chimæra abbreviata*, *Histiobranchus infernalis*, *Notacanthus analis*, *Sigmops stigmaticus*, *Hyperchoristus tanneri*, *Alepocephalus productus*, *Halosaurus goodei*, *Plectromus suborbitalis*, *Stephanoberyx monæ*, *Caulolepis longidens*, *Bassozetus normalis*, *Onos rufus*.

2.

1884. GILL, THEODORE, and JOHN A. RYDER. Diagnoses of new genera of Nemichthyoid eels.

*Proc. U. S. Nat. Mus.* 1883, vol. 6, pp. 260-262.

The new genera and species described are as follows: *Serrivomer*, *Spinivomer*, *Labichthys*, *Serrivomer beanii*, *Spinivomer goodei*, *Labichthys carinatus*, *L. elongatus*.

3.

1884. GILL, THEODORE. Deep-sea fishing fishes.

*Forest and Stream*, vol. 21, Nov. 8, p. 284.

The following genera and species from *Albatross* dredgings are described as new: *Typhlopsaras shufeldtii*, *Cryptopsaras couesii*.

3a.

1884. GILL, THEODORE, and JOHN A. RYDER. On the anatomy and relations of the Eurypharyngidæ.

*Proc. U. S. Nat. Mus.* 1883, vol. 6, pp. 262-273.

Material dredged by the *Albatross*. *Gastrostomus bairdii* described as new genus and species.

4.

1884. TANNER, Z. L., Lieut., U. S. N. Report on the work of the U. S. F. C. steamer *Fish Hawk* for the year ending Dec. 31, 1882, and on the construction of the steamer *Albatross*.

*Rep. U. S. F. C.* 1882, pp. 3-34, 3 pls.

5.

1884. GILL, THEODORE. The ichthyological peculiarities of the Basalialian Fauna.

*Science*, vol. 3, No. 68, pp. 620-622, 3 cuts.

Based on *Albatross* dredgings; 28 families noted as founded on deep-sea fishes.

6.

1884. GILL, THEODORE. Three new families of fishes added to the deep-sea fauna in a year.

*Am. Nat.*, vol. 18, p. 433.

Notes on *Derichthyidæ* and *Stephanoberycidæ* from *Albatross* dredgings. The third family, *Eurypharyngidæ*, described previously. The new genera are *Derichthys*, *Acanthochænus* and *Aleposomus*; new species, *Derichthys serpentinus*, *Acanthochænus lutkenii*, *Aleposomus copei*.

7.

1885. GILL, THEODORE, and JOHN A. RYDER. On the literature and systematic relations of the Saccopharyngoid fishes.

*Proc. U. S. Nat. Mus.*, 1884, vol. 7, pp. 48-65, 1 pl.

Based in part on *Albatross* collections. Remarks on bibliography, history, relationship, synonymy, etc.

8.

1884. BAIRD, G. W., P. A. Engr., U. S. N. Annual report on the electric lighting of the U. S. steamer *Albatross*, Dec. 31, 1883.

*Bull. U. S. F. C.* 1884, vol. 4, pp. 153-158, 8 figs.

9.

1884. BAIRD, G. W., P. A. Engr., U. S. N.  
Report on the working of the  
boilers and engine of the U. S.  
F. C. steamer *Albatross*.

*Bull. U. S. F. C.* 1884, vol. 4, pp. 145-  
151, 6 figs.

10.

1884. SMITH, SIDNEY I. Report on the  
Decapod Crustacea of the *Alba-*  
*tross* dredgings off the east coast  
of the United States in 1883.

*Rep. U. S. F. C.* 1882, vol. 10, pp. 345-  
426, 10 pls.

The new genera and species here  
described are as follows: *Ethusina*,  
*Benthæcetes*, *Parapasiphaë*, *Ethusina*  
*abyssicola*, *Galacantha bairdii*, *Penta-*  
*cheles nanus*, *P. debilis*, *Pontophilus*  
*abyssi*, *Acanthephyra eximea*, *Notosto-*  
*mus robustus*, *Pasiphaë princeps*, *Para-*  
*pasiphaë sulcatifrons*, *P. cristata*, *P.*  
*compta*, *Benthesicymus carinatus*, *Ama-*  
*lopanæus valens*, *Aristeus tridens*, *Hepo-*  
*madus tener*, *Hymenopanceus microps*,  
*Sergestes mollis*.

11.

1884. VERRILL, A. E. Second catalogue  
of Mollusca recently added to  
the fauna of the New England  
coast and adjacent parts of the  
Atlantic, consisting mostly of  
deep-sea species, with notes on  
others previously recorded.

*Trans. Conn. Acad. Arts and Sci-*  
*ences*, vol. 6, pp. 139-294, 5 pls.

Based chiefly on *Albatross* dredgings.  
New genera and species described are  
as follows: *Leptoteuthis*, *Eledonella*,  
*Gymnobela*, *Benthodolium*, *Leptoteuthis*  
*diaphana*, *Eledonella pygmæa*, *Pleuroto-*  
*mella bairdii*, *P. benedicti*, *P. sandersoni*,  
*P. saffordi*, *P. diomedææ*, *P. emertoni*,  
*P. bruneri*, *P. catharinae*, *Gymnobela*  
*engonia*, *G. curta*, *G. curta subangulata*,  
*Bela subvitrea*, *B. suburgida*, *Spirotro-*  
*pis ephamilla*, *Typhlomangelia tanneri*,  
*Marginella borealis*, *Buccinum abysso-*  
*rum*, *Sipho obesus*, *S. profundicola*, *S.*  
*profundicola dispar*, *S. cælatus hebes*, *S.*  
*(Mohnia) cælatulus*, *S. (Mohnia) sim-*  
*plex*, *S. leptaleus*, *Benthodolium abysso-*  
*rum*, *Cingula brychia*, *C. syngenes*, *C.*  
*leptalea*, *C. apicina*, *Cithna cingulata*,  
*C. (?) olivacea*, *Seguenzia eritima*, *S.*  
*formosa nitida*, *Eulimella lucida*, *E.*  
*charissa*, *E. nitida*, *E. (or Menestho)*  
*lissa*, *Odostomia tornata*, *O. disparilis*,  
*Cyclostrema cingulatum*, *C. affine*, *C.*  
*diaphanum*, *Cocculina leptalea*, *Coccu-*  
*lina dalli*, *C. conica*, *Puncturella (Fis-*

11.

1884. VERRILL, A. E.—Continued.

*surisepta*) *eritmeta*, *Propilidium ele-*  
*gans*, *Scaphander nobilis*, *Atlanta pul-*  
*chella*, *Dentalium solidum*, *Cadulus*  
*grandis*, *Thracia nitida*, *Poromya sub-*  
*levis*, *Næra undata*, *N. gigantea*,  
*Yoldia regularis*, *Leda bushiana*, *Pec-*  
*ten leptaleus*, *Octopus carolinensis*, *O.*  
*gracilis*, *Bela rathbuni*, *Urosalpinx car-*  
*olinensis*, *U. macra*, *Sipho hispidulus*,  
*Cingula sandersoni*, *Rotella cryptospira*,  
*Ethalia multistriata*, *Taranis morchii*  
*tornatus*, *Cyclostrema dalli ornatum*.

12.

1884. VERRILL, A. E. List of deep-water  
and surface Mollusca taken off  
the east coast of the United States  
by the U. S. F. C. steamers  
*Fish Hawk* and *Albatross*, 1880-  
1883.

*Ext. Conn. Acad. Sci. Transactions*,  
*New Haven*. The society. July.  
vol. 6, pp. 263-290. 8°.

Lists giving bathymetric range.

13.

1885. TANNER, Z. L., Lieut. Commander,  
U. S. N. Report on the construc-  
tion and outfit of the U. S. F. C.  
steamer *Albatross*.

*Rep. U. S. F. C.* 1883, part 11, pp. 3-116,  
55 pls., 20 figs.

Contains chapters on the construction  
of the vessel, machinery, and appliances,  
apparatus for deep-sea research, meth-  
ods of sounding, etc.

14.

1885. TANNER, Z. L., Lieut. Commander,  
U. S. N. Report on the work  
of the U. S. F. C. steamer *Alba-*  
*tross* for the year ending Decem-  
ber 31, 1883.

*Rep. U. S. F. C.* 1883, part 11, pp. 117-  
236, 3 pls.

General outline of contents: Investi-  
gations of menhaden and mackerel fish-  
eries; records of sounding, dredging,  
and other operations; list of fishes  
dredged, etc.; report of naturalist, etc.

15.

1885. SCHROEDER, SEATON, Lieut., U. S.  
N. Hydrographic work of the  
*Albatross* in 1884.

*Bull. U. S. F. C.* 1885, vol. 5, pp. 269,  
270.

Chiefly hydrographic notes relating  
to the West Indies.

16.

1885. VERRILL, A. E. Results of the explorations made by the steamer *Albatross* off the northern coast of the United States in 1883.

*Rep. U. S. F. C. 1883*, part 11, pp. 503-699, 44 pls.

Contains chapters on character of deep-sea deposits; fauna of deep water; notes on several groups of invertebrates; fauna of northern waters; lists of species dredged, with descriptions of new species; fauna of shallow waters near Cape Hatteras; fauna of surface waters of Gulf Stream, etc. New genera and species described as follows: *Nauphantopsis*, *Pterophysa*, *Angelopsis*, *Ephyroides*, *Synapta brychia*, *Ophiacantha fraterna*, *O. varispina*, *O. gracilis*, *Amphiura fragilis*, *Mangilia ephamilla*, *M. oxytata*, *M. glypta*, *Niso ægleës*, *Dentalium leptum*, *Cadulus carolinensis*, *Næra costata*, *Atolla verrillii*, *Nauphantopsis diomedææ*, *Pterophysa grandis*, *Angelopsis globosa*.

17.

1885. VERRILL, A. E. Notice of the remarkable marine fauna occupying the outer banks off the southern coast of New England. No. 11. [Brief contributions to zoology from the museum of Yale College. No. LVII.] *Work of the Albatross in 1884*.

*Am. Jour. Sci.* 1885, third series, vol. 29, No. 170, Feb., pp. 149-157.

*Work of the Albatross in 1884*. The genus *Benthoptillum* and the following species described as new: *Benthoptillum sertum*, *Desmophyllum nobile* V., *Hymenaster modestus*, *Archaster sepius*, *Solaster abyssicola* V., *Ophiacantha crassidens*, *O. enopla*, *O. granulifera* V., *O. aculeata*, *Ophiomitra spinea* V.

18.

1885. VERRILL, A. E. Third catalogue of Mollusca recently added to the fauna of the New England coast and the adjacent parts of the Atlantic, consisting mostly of deep-sea species, with notes on others previously recorded.

*Trans. Conn. Acad. of Arts and Sciences 1885*, vol. 6, pp. 395-452, 3 pls.

Based on *Albatross* dredgings. Contains notes on character of deep-sea deposits and lists giving bathymetric range. The genus *Benthoteuthis*, and the following species are described as new: *Ancistrocheirus megaptera*, *Teleoteuthis (Onychia) agilis*, *Benthoteuthis megalops*, *Cirrhototeuthis plena*, *C. me-*

18.

1885. VERRILL, A. E.—Continued.

*gaptera*, *Pleurotomella jeffreysii*, *P. tinctoria*, *P. frielei*, *P. vitrea*, *P. lottæ*, *Gymnobela brevis*, *Bela blakei*, *Admete nodosa*, *Marginella virginiana*, *Trophon abyssorum*, *T. abyssorum limicola*, *Jumala brychia*, *Omalaxis nobilis*, *Delphinula nitida*, *Puncturella abyssicola*, *Cocculina reticulata*, *Turbonilla perle-pida*, *T. grandis*, *Actæon hebes*, *Cylichna eburnea*, *Pleurobranchus americanus*, *Dentalium laqueatum*, *Cadulus spectabilis*, *Periploma undulata*, *Pecchiolia granulifera*, *Choristodon (?) cancellatus*, *Cryptodon grandis*, *C. plicatus*, *Kelliella nitida*, *Nucula trigona*, *Arca profundicola*, *Limopsis plana*, *L. affinis*, *Crenella fragilis*, *Pecten undatus*.

19.

1885. BUSH, KATHERINE J. Additions to the shallow-water Mollusca of Cape Hatteras, N. C., dredged by the U. S. F. C. steamer *Albatross* in 1883 and 1884.

*Trans. Conn. Acad. of Arts and Sciences 1885*, vol. 6, pp. 453-480, 1 pl.

The following are described as new: *Mangilia psila*, *M. eritima*, *M. ceroplasta*, *Skenea trilix*, *Scalaria leptalea*, *S. teres*, *Odostomia engonia*, *O. engonia teres*, *Cylichna cæolata*, *Volvula oxytata*, *V. minuta*, *Cadulus incisus*, *Pandora carolinensis*, *Venericardia obliqua*.

20.

1885. SMITH, SIDNEY I. On some new or little-known Decapod Crustacea, from recent Fish Commission dredgings off the east coast of the United States.

*Proc. U. S. Nat. Mus.* 1884, vol. 7, pp. 493-511.

Descriptions of new genera and species, mostly from *Albatross* dredgings: *Ephyrina*, *Benthonectes*, *Munidopsis crassa*, *M. similis*, *Bythocaris gracilis*, *B. nana*, *Acanthephyra microphthalmia*, *A. brevirostris*, *Ephyrina benedicti*, *Benthonectes filipes*.

21.

1885. RIDGWAY, ROBERT. On a collection of birds made by Messrs. J. E. Benedict and W. Nye, of the steamer *Albatross*.

*Proc. U. S. Nat. Mus.* 1884, vol. 7, pp. 172-180.

Collections from St. Thomas, W. I.; Curaçao, Venezuela; Sabanilla, New Granada; Old Providence, Caribbean Sea. The following species are described as new: *Mimus gilvus rostratus*, *Dendroica rufopileata*, *Icterus curaso-*



21.

1885. RIDGWAY, ROBERT—Continued.  
*ensis*, *Zenaida vinaceo-rufa*, *Certhiola tricolor*, *Vireosylva grandior*, *Vireo approximans*, *Elainea cinerascens*.

22.

1885. RIDGWAY, ROBERT. Descriptions of some new specie. of birds from Cozumel Island, Yucatan.

*Proc. Biol. Soc. Wash.*, vol. 3, 1884-85.

Preliminary descriptions—see No. 37, Catalogue of Cozumel birds.

23.

1885. RIDGWAY, ROBERT. A new petrel for North America.

*The Auk*, 1885, vol. 2, pp. 386-387.

A record of the capture on board the *Albatross* of *Pelagodroma marina*.

24.

1885. NYE, JR., WILLARD. Notes taken during cruise of the *Albatross* to Grand Banks in June and July, 1885.

*Bull. U. S. F. C.* 1885, vol. 5, p. 336.

25.

1885. NYE, JR., WILLARD. Notes upon octopus, flying-fish, etc., taken during the *Albatross* cruise in January, 1884.

*Bull. U. S. F. C.* 1885, vol. 5, pp. 189-190.

26.

1886. BEAN, TARLETON H. Description of a new species of *Plectromus* (*P. crassiceps*) taken by the U. S. Fish Commission.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 73, 74.

This specimen was dredged by the *Albatross* in 2,949 fathoms.

27.

1886. GOODE, G. BROWN, and TARLETON H. BEAN. Description of *Lep-tophidium cervinum* and *L. mar-moratum*, new fishes from deep water off the Atlantic and Gulf coasts.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 422-424.

28.

1886. GOODE, G. BROWN, and TARLETON H. BEAN. Descriptions of new fishes obtained by the United States Fish Commission mainly from deep water off the Atlantic and Gulf coasts.

28.

1886. GOODE, G. BROWN, and TARLETON H. BEAN—Continued.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 589-605.

New genera and species here described are as follows: *Neobythites*, *Porogadus*, *Bathyonus*, *Aphoristia diomedæana*, *A. pusilla*, *Hemirhombus fimbriatus*, *Citharichthys ventralis*, *Etropus rimosus*, *Macrurus caribbæus*, *M. occa*, *Coryphænoides sulcatus*, *Malacocephalus occidentalis*, *Bathygadus cavernosus*, *B. macrops*, *B. longifilis*, *Neobythites gilli*, *Porogadus miles*, *Bathyonus catena*, *B. pectoralis*.

29.

1886. GOODE, G. BROWN, and TARLETON H. BEAN. Descriptions of thirteen species and two genera of fishes from the *Blake* collection.

*Bull. Mus. Comp. Zool.*, vol. 12, No. 5, pp. 153-170.

Based in part on *Albatross* collections. The new genera and species described are as follows: *Barathronus*, *Benthosaurus*, *Aphoristia marginata*, *A. pigra*, *Monolene atrimana*, *Citharichthys dinoceros*, *Bathygadus arcuatus*, *B. favosus*, *Neobythites robustus*, *N. marginatus*, *Aphyonius mollis*, *Barathronus bicolor*, *Bregmaceros atlanticus*, *Peristedium longispatha*, *P. platycephalum*, *Benthosaurus grillator*.

30.

1886. FEWKES, J. WALTER. Report on the Medusæ collected by the U. S. F. C. steamer *Albatross*, in the region of the Gulf Stream, in 1883-84.

*Rep. U. S. F. C.* 1884, part 12, pp. 927-980, 10 pls.

A systematic arrangement of the species, with the following genera and species described as new: *Nauphantopsis*, *Ephyroides*, *Pterophysa*, *Angelopsis*, *Periphylla humilis*, *Atolla bairdii*, *A. verrilli*, *Nauphantopsis diomedææ*, *Ephyroides rotaformis*, *Solmaris incisa*, *Polycanna americana*, *Mesonema bairdii*, *Rhizophysa uvaria*, *Pterophysa grandis*, *Angelopsis globosa*.

31.

1886. FEWKES, J. WALTER. On a collection of Medusæ made by the steamer *Albatross* in the Caribbean Sea and Gulf of Mexico.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 397-402.

Nine species discussed.

32.

1886. RATHBUN, RICHARD. Report upon the Echini collected by the U. S. F. C. steamer *Albatross* in the Caribbean Sea and Gulf of Mexico, January to May, 1884.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 83-89.

A list of 23 species, with brief notes.

33.

1886. RATHBUN, RICHARD. Notice of a collection of Stalked Crinoids made by the steamer *Albatross* in the Gulf of Mexico and Caribbean Sea, 1884 and 1885.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 628-635.

Descriptive notes on 4 species.

34.

1886. RATHBUN, RICHARD. Report upon the Echini collected by the U. S. F. C. steamer *Albatross* in the Gulf of Mexico from January to March, 1885.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 606-620.

Notice of the cruise, with an account of species obtained: Lists of species obtained in 1884-85 off Atlantic coast, in the Gulf of Mexico and Caribbean Sea.

35.

1886. TANNER, Z. L. Report on the work of the U. S. F. C. steamer *Albatross* for the year ending December 31, 1884.

*Report U. S. F. C.* 1884, part 12, pp. 3-116, 3 pls.

Outline of contents: Hydrographic and dredging operations in Caribbean Sea; fishery and deep-sea investigations off New England coast; records of dredging and other operations, report of naturalist, etc.

36.

1886. RIDGWAY, ROBERT. Description of a new hawk from Cozumel.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 94-95.

*Rupornis gracilis* described as a new species.

37.

1886. RIDGWAY, ROBERT. Catalogue of a collection of birds made on the island of Cozumel, Yucatan, by the naturalists of the U. S. F. C. steamer *Albatross*, Capt. Z. L. Tanner, commander.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 560-583.

An annotated catalogue of 64 species, one (*Centurus rubriventris pygmæus*) described as new. Full descriptions are given of several species, of which brief diagnoses only were given, when first received, in the *Proc. Biol. Soc. Wash.* 1884-85. These are as follows: *Harporhynchus guttatus*, *Troglodytes beani*, *Dendroica petechia rufivertex*, *Vireo cinereus*, *V. bairdi*, *Cyclorhis insularis*, *Spindalis benedicti*, *Euetheia olivacea intermedia*, *Cardinalis cardinalis saturatus*, *Myiarchus platyrhynchus*, *Empidonax gracilis*, *Attila cozumelæ*, *Lampornis prevosti thalassinus*, *Chlorostilbon forficatus*, *Centurus dubius leei*, *Centurus rubriventris pygmæus*, *Rupornis magnirostris gracilis*.

38.

1886. RIDGWAY, ROBERT. Description of four new species of birds from the Bahama Islands.

*The Auk.*, 1886, vol. 3, July, pp. 334-337.

New species described from collections made by the *Albatross*: *Geothlypis coryi*, *G. tanneri*, *Centurus nyanus*, *C. blakei*.

39.

1886. SMITH, SIDNEY I. On some genera and species of Penæidæ, mostly from recent dredgings of the U. S. Fish Commission.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 170-190.

The genus, *Parapenæus*, and the following species here described as new: *Parapenæus megalops*, *P. goodei*, *Hymenopenæus robustus*, *H. modestus*.

40.

1886. SMITH, SIDNEY I. Description of a new crustacean allied to *Homarus* and *Nephrops*.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 167-170.

*Eunephrops bairdii* described as new genus and species.

41.

1886. VERRILL, A. E. Notice of recent additions to the Marine Invertebrata of the northeastern coast of America, with descriptions of new genera and species and critical remarks on others. Part V.—Annelida, Echinodermata, Hydroida, Tunicata.

*Proc. U. S. Nat. Mus.* 1885, vol. 8, pp. 424-448.

The genus *Ophioglycera* and the following new species described: *Polynoë aurantiaca*, *Leanira robusta*, *Amphinome lepadis*, *Leodice benedicti*, *Notophyllum americanum*, *Anaitis formosa*, *A. picta*, *Castalia cincinnata*, *Polydora tubifex*, *Syllis spongiphila*, *Ophioglycera gigantea*, *Ammochares artifex*, *Lepræa abyssicola*, *Sabella picta*, *Synapta brychia*, *Ophiacantha fraterna*, *O. varispina*, *O. gracilis*, *Amphiura fragilis*, *Cladocarpus flexilis*, *Culeolus tanneri*.

42.

1886. WASHBURN, F. L. Deep-sea dredging on the U. S. S. *Albatross*.

*Trans. Am. Fish. Soc.*, pp. 17-21.

A brief description of the ship and the methods of deep-sea exploration.

43.

1887. BENEDICT, JAMES E. Descriptions of 10 species and a new genus of Annelids from the dredgings of the steamer *Albatross*.

*Proc. U. S. Nat. Mus.* 1886, vol. 9, pp. 547-553, 6 pls.

The genus *Crucigera* and the following species described: *Protula diomedæ*, *P. alba*, *Hydroides spongicola*, *H. protulicola*, *Crucigera websteri*.

44.

1887. COLLINS, Capt. J. W. Report on the discovery and investigation of fishing grounds made by the *Albatross* during a cruise along the Atlantic coast and in the Gulf of Mexico, with notes on the Gulf fisheries.

*Rep. U. S. F. C.* 1885, part 13, pp. 217-311, 10 pls.

Contains chapters on shore and bank fisheries, sponge, turtle, red-snapper, and other fisheries, statistics, etc.

45.

1887. TANNER, Z. L. Report on the work of the U. S. F. C. steamer *Albatross* for the year ending December 31, 1885.

*Rep. U. S. F. C.* 1885, part 13, pp. 3-89, 5 pls., 9 figs.

Outline of contents: Fishery, hydrographic and deep-sea investigations off South Atlantic coast, in Gulf of Mexico, and off New England coast; notes on results of dredge hauls; tabular records of dredging and other operations; report of naturalist, etc.

46.

1887. TANNER, Z. L. Record of hydrographic soundings and dredging stations occupied by the steamer *Albatross* in 1886.

*Bull. U. S. F. C.* 1886, vol. 6, pp. 277-285.

47.

1887. SMITH, SIDNEY I. Report on the Decapod Crustacea of the *Albatross* dredgings off the east coast of the United States during the summer and autumn of 1884.

*Rep. U. S. F. C.* 1885, part 13, pp. 605-705, 20 pls.

Contains notes on bathymetrical distribution, character of eyes, number of eggs, etc.; systematic arrangement of species; the following described as new: *Notastomus vesus*, *Hymenodora gracilis*, *Benthesicymus moratus*.

48.

1887. COLLINS, J. W. Notes on an investigation of the great fishing banks of the western Atlantic.

*Bull. U. S. F. C.* 1886, vol. 6, pp. 369-381.

Notes by the writer as fishery expert on board the *Albatross* in June and July, 1885.

49.

1888. COPE, E. D. List of Batrachia and Reptilia of the Bahama Islands.

*Proc. U. S. Nat. Mus.* 1887, vol. 10, pp. 436-439.

Based partly on *Albatross* collections; *Liocephalus toxogrammus* described as a new species.

50.

1888. FEWKES, J. WALTER. Are there deep-sea Medusæ?

*Amer. Jour. Sci.*, 1888, third series, vol. 35, No. 206, Feb., pp. 166-179.

The writer states that "our present information is insufficient to answer the question."

51.

1888. RIDGWAY, ROBERT. Description of a new form of *Spindalis* from the Bahamas.

*Proc. U. S. Nat. Mus.* 1887, vol. 10, p. 3.

*Spindalis zena townsendi*, from Albatross collections, described as a new subspecies.

52.

1889. TANNER, Z. L. Report on the work of the U. S. F. C. steamer *Albatross* for the year ending Dec. 31, 1886.

*Rep. U. S. F. C.* 1886, part 14, pp. 605-692, 10 pls.

Outline of contents: Investigations respecting mackerel, menhaden, bluefish, etc.; hydrographic, dredging, and fishery work among Bahama Islands and off New England coast; notes on results of dredge hauls; report of naturalist; list of fishes and birds taken among the Bahamas; tabular records of dredging and other operations.

53.

1889. TANNER, Z. L. Report of the movements and operations of the U. S. F. C. steamer *Albatross* from Sept. 15 to 20, 1887.

*Bull. U. S. F. C.* 1887, vol. 7, pp. 155-158.

54.

1889. DALL, WILLIAM HEALEY. A preliminary catalogue of the Shell-bearing Marine Mollusks and Brachiopods of the southeastern coast of the United States, with illustrations of many of the species.

*Bull. U. S. Nat. Mus.*, No. 37, 221 pp., 74 pls.

Contains bibliography, lists in tabular form showing range in depth, etc.; much of the data due to explorations of the *Albatross*.

55.

1889. FEWKES, J. WALTER. Report on the Medusæ collected by the U. S. F. C. steamer *Albatross* in the region of the Gulf Stream in 1885-86.

*Rep. U. S. F. C.* 1886, part 14, pp. 513-536, 1 pl.

A systematic arrangement of species with *Pleurophysa insignis* described as new genus and species.

56.

1889. RIDGWAY, ROBERT. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. Birds collected on the island of Santa Lucia, West Indies; Abrolhos Islands, Brazil; and at Straits of Magellan in 1887-88.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 129-139.

*Geositta longipennis* and *Upucerthia propinqua*, from Straits of Magellan, are described as new.

57.

1889. RIDGWAY, ROBERT. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. Birds collected in Galapagos Islands in 1888.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 101-128.

Contains lists of species known to the different islands of the archipelago. The following are described as new: *Nesomimus macdonaldi*, *N. personatus*, *Certhidea cinerascens*, *Geospiza conirostris*, *G. media*, *Cactornis brevirostris*, *C. hypoleuca*, *Camarhynchus townsendi*, *C. pauper*, *Pacilonetta galapagensis*.

58.

1889. SMITH, SANDERSON. Lists of the dredging stations of the U. S. Fish Commission, the U. S. Coast Survey, and the British steamer *Challenger*, in North American waters, from 1867 to 1887, together with those of the principal European government expeditions in the Atlantic and Arctic oceans.

*Rep. U. S. F. C.* 1886, part 14, pp. 871-1017, 5 chts.

58.

## 1889. SMITH, SANDERSON—Continued

Lists of dredging stations of U. S. F. C. steamers *Fish Hawk* and *Albatross*; vessels of U. S. Coast Survey; *Challenger*, *Travailleur*, *Talisman*, *Washington*; Swedish expeditions; Danish expeditions; *Lightning*, *Porcupine*, *Shearwater*, *Valorous*, *Knight Errant*, *Triton*, *Josephine*, etc.; list of the deep-water dredgings north of the Bahamas, serial temperatures, etc.

58a.

## 1889. GOODE, G. BROWN. The depths of the ocean.

*Atlantic Monthly*, Jan. 7, pp. 124-128.

59.

1890. TANNER, Z. L., et al. Explorations of the fishing grounds of Alaska, Washington Territory, and Oregon, during 1888, by the U. S. F. C. steamer *Albatross*.

*Bull. U. S. F. C.* 1888, vol. 8, pp. 1-95, 10 pls., 2 chts.

Compiled from the reports of Commander Tanner, C. H. Townsend, and A. B. Alexander, with introduction by Richard Rathbun. Presents in detail the results of hydrographic dredging and fishery investigations throughout the regions named.

60.

## 1890. BEAN, TARLETON H. Notes on fishes collected at Cozumel, Yucatan, by the U. S. Fish Commission, with descriptions of new species.

*Bull. U. S. F. C.* 1888, vol. 8, pp. 193-206, 2 pls.

Sixty species collected by the *Albatross* considered—the following described as new: *Xyrichthys ventralis*, *X. infirmus*, *Scarus cuzamilæ*.

61.

1890. BEAN, TARLETON H. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. VIII.—Description of a new cottoid fish from British Columbia.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 641, 642.

The genus and species (*Synchirus gilli*) described as new.

62.

1890. COPE, E. D. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. III.—Report on the Batrachians and Reptiles collected in 1887-88.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 141-147.

Collections from the West Indies, the east coast of Brazil, Argentine Republic, Chile, Panama, the Galapagos Islands, Lower California, and Pacific coast of North America. The following species are described as new: *Zachænus roseus*, *Paludicola frenata*, *Phyllodactylus leei*, *Tropidurus lemniscatus*.

63.

1890. DALL, WILLIAM HEALEY. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. VII.—Preliminary report on the collection of Mollusca and Brachiopoda obtained in 1887-88.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 219-362, 10 pls.

The collections were made during the voyage of the *Albatross* from Norfolk, Va., to San Francisco, Cal., via Straits of Magellan. Mollusks were obtained at 80 dredging stations and 27 anchorages. Contains copious notes, descriptions of the new species, and discussion of the conditions under which deep-sea mollusks exist. New species: *Malletia goniura*, *M. æolata*, *M. agathida*, *M. acinula*, *M. virens*, *Yoldia scapania*, *Leda cestrota*, *L. platessa*, *L. pontonia*, *Nucula callicredemna*, *Cryptodon fuegiensis*, *Callocardia albida*, *Cytherea eucymata*, *Cymatoica occidentalis*, *C. orientalis*, *Verticordia perplicata*, *Cuspidaria monosteira*, *C. chilensis*, *Poromya cymata*, *P. microdonta*, *Dentalium megathyris*, *Cadulus albicomatus*, *Actæon curtulus*, *A. perconicus*, *Scaphander interruptus*, *Leucosyrinx persimilis*, *L. goodei*, *Pleurotoma exulans*, *Calliotectum vernicosum*, *Pleurotomella cingulata*, *P. argeta*, *P. agonis*, *P. suffusa*, *Volutilithes philippiana*, *Conomitra intermedia*, *Mesorhytis costatus*, *Buccinum viridum*, *Chrysodomus amiantus*, *C. griseus*, *C. aphelus*, *C. testudinis*, *Nassa townsendi*, *Columbella permodesta*, *Murex leeanus*, *Scala pompholyx*, *Adeorbis sincera*, *Cocculina pocillum*, *Halistylus columna*, *Calliotoma platinum*, *C. rioensis*, *Turricula macdonaldi*, *Solariella oxybasis*, *S. actinophora*.

64.

1890. AGASSIZ, ALEXANDER. Notice of *Calamocrinus diomedæ*, a new Stalked Crinoid from the Galapagos, dredged by the U. S. F. C. steamer *Albatross*, Lieut. Commander Z. L. Tanner, U. S. N., commanding.

*Bull. Mus. Comp. Zool.*, vol. 20, pp. 165-167.

A preliminary account. See detailed account *Calamocrinus diomedæ*, etc., Agassiz, 85.

65.

1890. JORDAN, DAVID STARR. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. IX.—Catalogue of fishes collected at Port Castries, St. Lucia, by the steamer *Albatross*, Nov., 1888.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 645-652

Notes, with description of one new species—*Corvula sanctæ-luciæ*.

66.

1890. JORDAN, DAVID STARR, and CHARLES HARVEY BOLLMAN. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. IV.—Descriptions of new species of fishes collected at the Galapagos Islands and along the coast of the United States of Colombia, 1887-88.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 149-183.

Four new genera and 31 new species are described: *Xenocys*, *Bollmannia*, *Runula*, *Engyophrys*; *Raja equatorialis*, *Discopyge ommata*, *Urolophus goodei*, *Synodus evermanni*, *S. jenkinsi*, *Ophiodon nitens*, *Ophichthus evionthas*, *O. rugifer*, *Menidia gilberti*, *Stromateus palometa*, *Diplectrum euryplectrum*, *Prionodes stilbostigma*, *Kuhlia arge*, *Xenocys jessie*, *Larimus pacificus*, *Polycirrhus rathbuni*, *Kathetostoma averruncus*, *Bollmannia chlamydes*, *Scorpena russula*, *Prionotus quiescens*, *P. albirostris*, *P. xenisma*, *Runula azalea*, *Porichthys nautopædium*, *Otophidium indefatigabile*, *Bregmaceros bathymaster*, *Azevia querna*, *Engyophrys sancti-laurentii*, *Symphurus atramentatus*, *S. leei*, *Leptopidium prorates*.

67.

1890. HOWARD, L. O., et al. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. V.—Annotated catalogue of the insects collected in 1887-88.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 185-216.

Contains notes and descriptions of new genus and species from San Clemente Island, California, Lower California and Panama, Galapagos Islands, St. Lucia, W. I., and coasts of South America: *Thymele*, *Protoparce calapagensis*, *Centruroides luctifer*, *Spirobolus sanctæ-luciæ*, *Pectiniunguis americanus*, *Scolopendra microcanthus*, *S. galapagoensis*, *S. macracanthus*, *Vejovis galapagoensis*, *Timogenes niger*.

68.

1890. STEARNS, ROBERT E. C. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XVII.—Descriptions of new West American land, fresh-water, and marine shells, with notes and comments.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 205-225.

The following genus and species are described as new: *Cyclothyca*; *Helix coloradoensis*, *H. magdalenensis*, *Holospira semisculpta*, *H. arizonensis*, *Melania acutifilosa*, *Cyclothyca corrugata*, *Mitra nodocancellata*, *Venericardia barensis*, *Lucina æquizonata*, *Venus effeminata*, *Periploma discus*.

69.

1890. VASEY, GEORGE. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. VI.—List of the plants collected in Alaska in 1888.

*Proc. U. S. Nat. Mus.* 1889, vol. 12, pp. 217, 218.

A list of species by localities.

70.

1891. TANNER, Z. L. Report on the work of the U. S. F. C. steamer *Albatross* from Jan. 1, 1887, to June 30, 1888.

*Rep. U. S. F. C.* 1887, part 15, pp. 371-435, 4 pls.

Outline of contents: Deep-sea investigations off North Atlantic coast;



70.

## 1891. TANNER, Z. L.—Continued.

investigations during voyage from Norfolk, Va., to San Francisco, Cal., including West Indies, Straits of Magellan, Galapagos Islands, etc; notes on results of dredge hauls; tabular records of dredging and other operations.

71.

1891. TANNER, Z. L. The fishing grounds of Bristol Bay, Alaska: A preliminary report upon the investigations of the U. S. F. C. steamer *Albatross* during the summer of 1890.

*Bull. U. S. F. C.* 1889, vol. 9, pp. 279-288.  
3 chts.

Notes on hydrography and on the cod and salmon fisheries.

72.

1891. GILBERT, CHARLES H. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XII.—A preliminary report on fishes collected by the steamer *Albatross* on the Pacific coast of North America during the year 1889, with descriptions of 12 new genera and 92 new species.

*Proc. U. S. Nat. Mus.* 1890, vol. 13,  
pp. 49-126.

Collections from anchorages and the dredging stations off the coasts of Washington, Oregon, California, and Lower California: *Leuroglossus*, *Calotomus*, *Xenochirus*, *Gillellus*, *Cryptotrema*, *Plectobranchnus*, *Lucioblennius*, *Aprodon*, *Lycodapus*, *Lioglossina*, *Radulinus*, *Bathyagonus*, *Myctophum nannochir*, *M. mexicanum*, *M. protocus*, *Bathytroctes stomias*, *Synodus lacertinus*, *Etrumeus acuminatus*, *Argentina sialis*, *Leuroglossus stilbicus*, *Neoconger vermiformis*, *Ophichthys notochir*, *Exocoetus xenopterus*, *Melamphæus cristiceps*, *M. lugubris*, *Serranus æquidens*, *Pronotogrammus eos*, *Micropogon megalops*, *Cynoscion macdonaldi*, *Pseudojulis adustus*, *P. melanotis*, *P. inornatus*, *Halichoeres sellifer*, *Thalassoma virens*, *T. grammaticum*, *T. socorroense*, *Calotomus xenodon*, *Microspathodon cinereus*, *Holacanthus clarionensis*, *Gobius zebra*, *G. dalli*, *Microgobius cyclolepis*, *Sebastichthys* sp., *S. alutus*, *S. rupestris*, *S. zacentrus*, *S. saxicola*, *S. diploproa*, *S. aurora*, *S. introniger*, *S. sinensis*, *S. goodei*, *Scorpena sierra*, *Icelinus filamentosus*, *I. tenuis*, *I. fimbriatus*, *I. ocu-*

72.

## 1891. GILBERT, CHARLES H.—Cont'd.

*latus*, *I. cavifrons*, *Radulinus asprellus*, *Bathyagonus nigripinnis*, *Xenochirus triacanthus*, *X. pentacanthus*, *X. latifrons*, *Paraliparis rosaceus*, *Gobiosox funebris*, *G. humeralis*, *G. eigenmanni*, *G. papillifer*, *Bathymaster hypoplectus*, *Gillellus semicinctus*, *G. arenicolus*, *Dactyloscopus lunaticus*, *Labrosomus cremnobates*, *Cryptotrema corallinum*, *Plectobranchnus evides*, *Lucioblennius alepidotus*, *Lycodes porifer*, *Lycodopsis crotalinus*, *L. crassilabris*, *Aprodon cortezi-anus*, *Lycodapus fierasfer*, *Leptophidium pardale*, *L. microlepis*, *L. stigmatistium*, *L. emmelas*, *Ophidium galeoides*, *Catætyx rubrirostris*, *Neobythites stelliferoides*, *Physiculus rastrelliger*, *P. nematopus*, *Macrurus scaphopsis*, *M. lolepis*, *M. stelgidolepis*, *Platophrys tæniop-terus*, *Citharichthys xanthostigma*, *C. fragilis*, *Ancylopsetta dendritica*, *Hippoglossina bollmani*, *Lioglossina tetrophthalmus*, *Cynicoglossus bathybius*, *Halieutæa spongiosa*, *Melichthys bispinosus*, *Idiacanthus antrostomus*, *Bathylagus pacificus*.

73.

1891. GILBERT, CHARLES H. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XIX.—A supplementary list of fishes collected at the Galapagos Islands and Panama, with descriptions of one new genus and three new species.

*Proc. U. S. Nat. Mus.* 1890, vol. 13,  
pp. 449-55.

Thirty-four species are considered, *Dialommus*, *Priacanthus serrula*, *Dialommus fuscus*, *Citharichthys platophrys* being described as new.

74.

1891. AGASSIZ, A. Three letters from Alexander Agassiz to Hon. Marshall McDonald, U. S. Commissioner of Fish and Fisheries, on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross*.

*Bull. Mus. Comp. Zool.*, vol. 21, pp.  
186-200.

Preliminary reports submitted during the voyage.

75.

1891. BEAN, TARLETON H. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XI.—New fishes collected off the coast of Alaska and the adjacent region southward.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 37-45.

The 4 new genera and 17 new species here described are all from dredging stations: *Bothrocara*, *Poroclinus*, *Dasycottus*, *Malacocottus*, *Chalinura serrula*, *Antimora microlepis*, *Lycodes brevipes*, *Bothrocara mollis*, *Maynea pusilla*, *M. brunnea*, *Poroclinus rothrocki*, *Careprocetus spectrum*, *Icelus scutiger*, *I. euryops*, *Dasycottus setiger*, *Malacocottus zonurus*, *Hemitripterus marmoratus*, *Psychrolutes zebra*, *Sebastolobus alascanus*, *Chauliodus macouni*, *Labichthys gilli*.

76.

1891. JORDAN, DAVID STARR. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XVIII.—List of fishes obtained in the harbor of Bahia, Brazil, and in adjacent waters.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 313-36.

One hundred and twelve species were from Bahia and 4 species from coast of Patagonia—the following described as new: *Verecundum rasile*, *Paralichthys isosceles*, *Psammobatis rutrum*.

77.

1891. VASEY, GEORGE, and J. N. ROSE. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XVI.—Plants collected in 1889 at Socorro and Clarion islands, Pacific Ocean.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 145-49.

Twenty-six species considered—three described as new: *Teucrium townsendii*, *Cardiospermum palmeri*, *Viguiera deltoidea townsendii*.

78.

1891. LUCAS, FREDERIC A. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XIII.—Catalogue of skeletons of birds collected at the Abrolhos Islands, Brazil, the Straits of Magellan, and the Galapagos Islands, in 1887-88.

78.

1891. LUCAS, FREDERIC A.—Cont'd.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 127-30.

A list of 33 species, with osteological notes.

79.

1891. WHITE, CHARLES A. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. X.—On certain Mesozoic fossils from the islands of St. Pauls and St. Peters in the Straits of Magellan.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 13, 14, 2 pls.

Two species considered—one (*Lucina townsendi*) described as new.

80.

1891. BENEDICT, J. E., and MARY J. RATHBUN. The genus *Panopeus*.

*Proc. U. S. Nat. Mus.* 1891, vol. 14, pp. 355-385, pls. XIX-XXIV.

Based in part on *Albatross* dredgings. New species described: *Panopeus areolatus*, *P. dissimilis*, *P. angustifrons*, *P. hemphillii*, *P. bermudensis*, *P. ovatus*.

81.

1891. RIDGWAY, ROBERT. List of birds collected on the Bahama Islands by the naturalists of the U. S. F. C. steamer *Albatross*.

*The Auk*, vol. 8, 1891, No. 4, Oct., pp. 333-339.

A list of species by localities.

82.

1891. TOWNSEND, C. H. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XIV. Birds from the coasts of western North America and adjacent islands, collected in 1888-89, with descriptions of new species.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 131-42.

Ninety two species considered, 12 described as new: *Speotyto rostrata*, *Zenaidura clarionensis*, *Troglodytes tanneri*, *Puffinus auricularis*, *Oceanodroma socorroensis*, *Amphispiza belli cinerea*, *Helminthophila celata sordida*, *Melospiza fasciata clemente*, *M. fasciata graminea*, *Otocoris alpestris insularis*, *O. alpestris pallida*.

83.

1891. TOWNSEND, C. H. The scientific results of explorations by the U. S. F. C. steamer *Albatross*. XV. Reptiles from Clarion and Socorro islands and the Gulf of California, with description of a new species.

*Proc. U. S. Nat. Mus.* 1890, vol. 13, pp. 143, 144.

Twelve species considered, one (*Uta clarionensis*) described as new.

84.

1891. TOWNSEND, C. H. Report upon the pearl fishery of the Gulf of California.

*Bull. U. S. Fish Com.* 1889, vol. 9, pp. 91-94, 3 pls.

Mentions dredging of pearl oysters by the *Albatross* in the Gulf of California.

85.

1892. AGASSIZ, ALEXANDER. Reports of an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by U. S. F. C. steamer *Albatross*, during 1891. I. Calamocrinus diomedæ, a new Stalked Crinoid, with notes on the apical system and the homologies of Echinoderms.

*Mem. Mus. Comp. Zool.* 1892, vol. 17, 96 pp., 32 pls.

An elaborate paper on one of the most interesting crinoids brought to light by any of the deep-sea dredging expeditions.

86.

1892. AGASSIZ, ALEXANDER. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross*. II. General sketch of the expedition of the *Albatross*, from Feb. to May, 1891.

*Bull. Mus. Comp. Zool.* 1892, vol. 23, pp. 1-90, 22 pls.

86.

1892. AGASSIZ, ALEXANDER—Cont'd.

Contains chapters on topography of the bottoms, character of bottom deposits, temperature, observations on pelagic fauna by *Albatross* and other expeditions, with critical remarks; aculephs, pelagic fauna of intermediate depths, fauna, flora, and topography of Galapagos Islands; deep-sea fauna compared with Caribbean Sea; color of deep-sea types, etc.

87.

1892. TANNER, Z. L. Report of the investigations of the U. S. F. C. steamer *Albatross* for the year ending June 30, 1889.

*Rep. U. S. F. C.* 1888, part 16, pp. 395-512, 3 pls.

Investigations of fisheries along coasts of Alaska, Washington, Oregon, California, Lower California, and in Gulf of California, notes on results of dredge hauls, tabular records of dredging and other operations.

88.

1892. TANNER, Z. L. Cable surveys from California to the Hawaiian Islands, 1891-92.

*Trans. and Proc. Geog. Soc. Pacific, San Francisco*, 1892, vol. 3, pp. 63-83

The article is based chiefly on *Albatross* soundings, and the practicability of the route demonstrated.

89.

1892. Report of the results of the survey for the purpose of determining the practicability of laying a telegraphic cable between the United States and the Hawaiian Islands.

*Senate Doc. 153, 52d Congress, 1st sess.*, 26 pp., 4 photos, 9 charts.

This report contains extensive tabulated data on the sounding operations of the U. S. F. C. steamer *Albatross* between San Francisco and Monterey, Cal., and Honolulu, H. I., with records of temperatures and specific gravities. Similar records on the work of the U. S. S. *Thetis* between Point Conception, Cal., and Hilo, H. I. The route along the line between Monterey and Honolulu reported as the most practicable. The *Albatross* data are from a report made by Lieut. Commander Z. L. Tanner, U. S. N., commanding.

90.

1892. Hydrographic Office, U. S. Navy.  
Submarine cables.

Rept. No. 103, U. S. Hyd. Office, 67 pp.,  
maps, charts, etc.

Prepared for publication as a part of  
the report of the survey by the U. S. F. C.  
steamer *Albatross* and the U. S. S. *Thetis*  
for a cable route between San Francisco  
and the Hawaiian Islands. Contains  
general instructions for deep-sea sound-  
ing by Commander Z. L. Tanner,  
U. S. N., with information respecting  
submarine cables.

91.

1892. GOODE, G. BROWN, and T. H.  
BEAN. The present condition of  
the study of deep-sea fishes.

Proc. Am. Ass. Adv. Sci., vol. 40, p. 324.

An abstract—a brief reference to the  
progress of deep-sea ichthyology.

92.

1892. GILBERT, CHARLES H. Scientific  
results of explorations by the  
U. S. F. C. steamer *Albatross*.  
XXI. Descriptions of apodal  
fishes from the tropical Pacific.

Proc. U. S. Nat. Mus. 1891, vol. 14, pp.  
347-52.

Collections from dredging stations off  
Panama, Galapagos Islands, and in the  
Gulf of California. Two genera and five  
species described as new: *Xenomystax*,  
*Ilyophis*, *Chlopsis equatorialis*, *Xenomy-*  
*stax atrarius*, *Ophisoma prorigerum*, *O.*  
*macrurum*, *Ilyophis brunneus*.

93.

1892. GILBERT, CHARLES H. Scientific  
results of explorations by the  
U. S. F. C. steamer *Albatross*.  
XXII. Descriptions of thirty-  
four new species of fishes col-  
lected in 1888 and 1889, princi-  
pally among the Santa Barbara  
Islands and in the Gulf of Cali-  
fornia.

Proc. U. S. Nat. Mus. 1891, vol. 14, pp.  
539-66.

Collections from shore and dredging  
stations. The genus *Chriolepis* and the  
following species described as new: *Raia*  
*trachura*, *Catulus xaniurus*, *C. cephalus*,  
*C. brunneus*, *Eulamia platyrhynchus*,  
*Stolephorus cultratus*, *Myctophum re-*

98.

1892. GILBERT, CHARLES H.—Cont'd.

*gale*, *Alepocephalus tenebrosus*, *Poroga-*  
*dus promelas*, *Siphostoma carinatum*,  
*Callechelys peninsulæ*, *Atherinops insu-*  
*larum*, *Mugilsetosus*, *Diplectrum sciurus*,  
*Mycteroperca pardalis*, *Bodianus acan-*  
*thisti*, *Upeneus xanthogrammus*, *Po-*  
*macentrus leucurus*, *Gobius microdon*,  
*Bollmania ocellata*, *B. macropoma*, *B.*  
*stigmatura*, *Gobiosoma crescentalis*,  
*Chriolepis minutillus*, *Gillellus ornatus*,  
*Prionotus gymnotethus*, *Careproctus*  
*melanurus*, *Paraliparis cephalus*, *P.*  
*mento*, *Trachyrhynchus helolepis*, *Macru-*  
*rus pectoralis*, *Lycodes diapterus*, *Sym-*  
*phurus fasciolaris*, *Antennarius reticu-*  
*laris*.

94.

1892. GOËS, A. Reports on the dredg-  
ing operations off the west coast  
of Central America to the Gala-  
pagos, to the west coast of Mex-  
ico, and in the Gulf of Califor-  
nia, in charge of Alexander  
Agassiz, carried on by the U. S.  
F. C. steamer *Albatross* during  
1891. III. On a peculiar type of  
Arenaceous Foraminifer from  
the American tropical Pacific,  
*Neusina agassizi*.

Bull. Mus. Comp. Zool. 1892, vol. 23,  
pp. 195-98, 1 pl.

95.

1892. DALL, WILLIAM H. Scientific  
results of explorations by the  
U. S. F. C. steamer *Albatross*.  
XX. On some new or interesting  
West American shells obtained  
from the dredgings of the U. S.  
F. C. steamer *Albatross* in 1888,  
and from other sources.

Proc. U. S. Nat. Mus. 1891, vol. 14, pp.  
173-91, 3 pls.

Thirty-four species are considered;  
the genus *Calypptogena* and twenty-one  
species are described as new: *Trophon*  
*cerrosensis*, *Cancellaria crawfordiana*,  
*Terebratella occidentalis obsoleta*, *Buc-*  
*cinum strigillatum*, *B. taphrium*, *Mohnia*  
*frielei*, *Strombella middendorffii*, *S. fra-*  
*gilis*, *S. melonis*, *Chrysodomus perisce-*  
*lidus*, *C. phæniceus*, *C. eucosmius*, *C.*  
*hypolispus*, *C. acosmius*, *C. halibrectus*,  
*Trophon scitulus*, *T. disparilis*, *Solemya*  
*johnsoni*, *Calypptogena pacifica*, *Limop-*  
*sis vaginatus*, *Chrysodomus ithius*.

96.

1892. RATHBUN, RICHARD. The U. S. Fish Commission, some of its work.

*Century Mag.* 1892, vol. 43, Mar., pp. 679-697; 20 cuts.

Contains some account of the fishery and deep-sea investigations of the *Albatross*, with illustrations showing her methods of work.

97.

1892. VERRILL, A. E. The Marine Nemertean of New England and adjacent waters.

*Trans. Conn. Acad. Arts and Sciences* 1892, vol. 8, pp. 382-456; 7 pls., 9 figs.

Based in part on *Albatross* collections. New genera and species described: *Nectonemertes*, *Hyalonemertes*; *Amphiporus multisorus*, *A. heterosorus*, *A. tetrasorus*, *A. frontalis*, *A. mesosorus*, *A. cæcus*, *Tetrastemma roseum*, *T. vermiculus catenulatum*, *T. dorsale unicolor*, *Lineus bicolor*, *Micrura dorsalis*, *M. rubra*, *Nectonemertes mirabilis*, *Hyalonemertes atlantica*.

98.

1892. VERRILL, A. E. Marine Planarians of New England.

*Trans. Conn. Acad. Arts and Sciences* 1892, vol. 8, pp. 459-520, 5 pls., 2 figs.

Based in part on *Albatross* collections. New genera and species: *Eustylochus*, *Heterostylochus*, *Planoceroopsis Stylochus frontalis*, *S. crassus*, *Leptoplana virilis*, *L. angusta*, *Trigonoporus dendriticus*, *Eurylepta maculosa*, *Aphanostoma aurantiacum*, *A. olivaceum*.

98a.

1892. Cruise of the *Albatross*.

*Bull. Am. Geog. Soc.* 1892, vol. 24, No. 3, pp. 464-467.

Notes from report to U. S. Fish Commission, relating to work of the vessel at various points between the Aleutian Islands and Gulf of California.

99.

1893. TANNER, Z. L. Report upon the investigations of the U. S. F. C. steamer *Albatross* from July 1, 1889, to June 30, 1891.

*Rep. U. S. F. C. 1889-1891*, part 17, pp. 207-342, 1 pl.

Outline of contents: Voyage to south-east Alaska with Senate Committee on Indian Affairs; investigations of fishing grounds off Oregon, Washington, California, and in Bering Sea; scientific investigations off the west coast of Mexico and Central America and off the

99.

1893. TANNER, Z. L.—Continued.

Galapagos Islands; notes on results of dredge hauls; report of fishery expert; tabular records of dredging and other operations.

99a.

1893. BROOKS, WILLIAM K. The genus *Salpa*.

*Mems. Biol. Lab. Johns Hopk. Univ.* 1893, 11, pp. 1-371, 57 pls.

Based in part on *Albatross* collections. A monograph of the genus.

100.

1893. BENEDICT, JAMES E. Corystoid crabs of the genera *Telmessus* and *Erimacrus*.

*Proc. U. S. Nat. Mus.* 1892, vol. 15, pp. 223-30, 3 pls.

*Erimacrus* described as a new genus.

101.

1893. BENEDICT, JAMES E. Preliminary descriptions of 37 new species of Hermit Crabs of the genus *Eupagurus* in U. S. Nat. Museum.

*Proc. U. S. Nat. Mus.* 1892, vol. 15, pp. 1-26.

Based largely on *Albatross* collections. New species described: *Eupagurus alaskensis*, *E. aleuticus*, *E. patagoniensis*, *E. smithi*, *E. impressus*, *E. floridanus*, *E. exilis*, *E. albus*, *E. gladius*, *E. defensus*, *E. capillatus*, *E. brandti*, *E. dalli*, *E. tanneri*, *E. confragosus*, *E. cornutus*, *E. townsendi*, *E. rathbuni*, *E. minutus*, *E. purpuratus*, *E. hemphilli*, *E. beringanus*, *E. newcombei*, *E. undosus*, *E. kennerlyi*, *E. setosus*, *E. munitus*, *E. gilli*, *E. curacaoensis*, *E. californiensis*, *E. mexicanus*, *E. roseus*, *E. corallinus*, *E. coronatus*, *E. varians*, *E. cervicornis*, *E. parvus*, *E. hispidus*.

102.

1893. BEARD, J. CARTER. The Abyssal depths of the sea.

*Cosmopolitan Magazine*, Mar., pp. 532-538, 11 cuts.

A popular account of deep-sea life and conditions, based chiefly on the investigations of the *Albatross*.

103.

1893. BEECHER, CHARLES E. The development of *Terebratalia obsoleta* Dall.

*Trans. Conn. Acad. Arts and Sciences* 1893, vol. 9, pp. 392-399, 3 pls.

104.

1893. FAXON, WALTER. Reports on dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by U. S. F. C. steamer *Albatross* during 1891. VI.—Preliminary Descriptions of new species of Crustacea.

*Bull. Mus. Comp. Zool.* 1893, vol. 24, pp. 149-220.

Five new genera and one hundred new species are described: *Maiopsis*, *Trachycarcinus*, *Calastacus*, *Scolophthalmus*, *Ceratommysis*, *Euprognatha granulata*, *Anamathia occidentalis*, *Maiopsis panamensis*, *Lambrus hassleri*, *Xanthodes sulcatus*, *Panopeus latus*, *P. tanneri*, *Achelous affinis*, *Trachycarcinus corallinus*, *Gecarcinus malpilensis*, *Pinixa panamensis*, *Osachila lata*, *Æthusa ciliatifrons*, *Æ. pubescens*, *Æthusa smithiana*, *Cymopolia tuberculata*, *Raninops fornicata*, *Rhinolithodes cristatipes*, *Echinocerus diomedæ*, *Paralomis aspera*, *P. longipes*, *Lithodes panamensis*, *Cancellus tanneri*, *Pylopagurus longimanus*, *P. affinis*, *P. hirtimanus*, *Catapagurus diomedæ*, *Spiropagurus occidentalis*, *Paguristes fecundus*, *Petrolisthes agassizii*, *Pachycheles panamensis*, *Munida obesa*, *M. refulgens*, *M. propinqua*, *M. gracilipes*, *Galacantha diomedæ*, *Munidopsis vicina*, *M. agassizii*, *M. villosa*, *M. hystrix*, *M. sericea*, *M. margarita*, *M. crinita*, *M. ornata*, *M. scabra*, *M. tanneri*, *M. hamata*, *M. quadrata*, *M. depressa*, *M. carinipes*, *M. hendersoniana*, *M. inermis*, *Uroptychus nitidus occidentalis*, *U. pubescens*, *U. bellus*, *Axius crista-galli*, *Calastacus stilirostris*, *Nephropsis occidentalis*, *Willemoesia inornata*, *Polychæles tanneri*, *P. sculptus pacificus*, *P. granulatus*, *Eryonicus spinulosus*, *Gnathophyllum panamense*, *Sclerocrangon atrox*, *S. procax*, *Pontophilus occidentalis*, *Paracrangon areolata*, *Glyphocrangon alata*, *G. spinulosa*, *G. sicarius*, *Heterocarpus vicarius*, *H. hostilis*, *H. affinis*, *Nematocarcinus agassizii*, *Acanthephyra cristata*, *A. cucullata*, *Notostomus fragilis*, *N. westergreni*, *Pasiphaea cristata americana*, *P. magna*, *Sicyonia affinis*, *S. picta*, *Peneus balboæ*, *Solenocera agassizii*, *Peneopsis diomedæ*, *Haliporus nereus*, *H. doris*, *H. thetis*, *Aristæus occidentalis*, *Hemipeneus triton*, *Benthesicymus tanneri*, *Sergestes inous*, *S. phorcus*, *S. halia*, *Gnathophausia dentata*, *Eucopia sculpticauda*, *Petalophthalmus pacificus*, *Scolophthalmus lucifugus*, *Ceratommysis spinosa*.

105.

1893. BEAN, TARLETON H. Description of a new species of star-gazer (*Cathetostoma albigutta*) from the Gulf of Mexico.

*Proc. U. S. Nat. Mus.* 1892, vol. 15, pp. 121, 122.

Based on specimens from *Albatross* dredgings.

105a.

1893. EVERMANN B. W. A skeleton of Steller's sea-cow.

*Science*, vol. 21, No. 52, Feb. 3, pp. 5-9.

An account of the finding of a nearly perfect skeleton on Bering Island and its purchase for the U. S. National Museum at the time of the visit of the *Albatross* to that island in 1892.

106.

1893. RATHBUN, MARY J. Catalogue of the crabs of the family Periceridæ in the U. S. National Museum.

*Proc. U. S. Nat. Mus.* 1892, vol. 15, pp. 231-277, pls. XXVIII-XL.

Based largely on *Albatross* collections. New species described: *Libinia macdonaldi*, *L. spinimana*, *L. mexicana*, *Pericera triangulata*, *P. atlantica*, *P. contigua*, *Macroceloma tenuirostra*, *Othonia carolinensis*, *O. nicholsi*, *O. rotunda*, *Mithrax pilosus*, *M. hemphilli*, *M. sinensis*, *M. bahamensis*, *M. braziliensis*.

107.

1893. LUDWIG, HUBERT. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and to the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* in 1897. IV. Vorläufiger Bericht über die erbeuteten Holothurien.

*Bull. Mus. Comp. Zool.* 1893, vol. 24, pp. 105-114.

A preliminary report on the collection of holothurians, with references to new genera and species to be described in a final report. See paper No. 124 (The Holothurioidea) by the same author.



108.

1893. SCUDDER, SAMUEL H. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* during 1891. VII. The Orthoptera of the Galapagos Islands.

*Bull. Mus. Comp. Zool.* 1893, vol. 25, pp. 1-26, 12 pls.

Five genera and seven species are described as new: *Galapagia*, *Closteridea*, *Halmenus*, *Desmopleura*, *Nesæcia*, *Anisolabis bormansi*, *Closteridea bauri*, *Halmenus robustus*, *Desmopleura cinnam*, *Anaulocomera darwinii*, *Conocephalus insulanus*, *Gryllus galapageius*.

109.

1893. SCHIMKÉWITSCH, W. M. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* during 1891. VIII. *Compte-Rendu sur les Panto-podes*.

*Bull. Mus. Comp. Zool.* 1893, vol. 25, pp. 27-44, 2 pls.

New species here described are as follows: *Collossendeis bicincta*, *C. macer-rima minor*, *C. gracilis pallida*, *C. sub-minuta*, *Ascorhynchus agassizii*, *Palle-nopsis californica*.

110.

1893. MERRILL, GEORGE P. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross*. V. Report upon rocks collected from the Galapagos Islands.

*Bull. Mus. Comp. Zool.* 1893, vol. 16, pp. 235-237.

111.

1894. TANNER, Z. L. Report upon the investigations of the U. S. F. C. steamer *Albatross* for the year ending June 30, 1892.

*Rep. U. S. F. C.* 1892, part 18, pp. 1-64, 1 pl.

General contents: Cruise to Pribilof Islands with U. S. Bering Sea commissioners; deep-sea and fishery investigations off coast of Washington; survey of cable route between California and Hawaiian Islands; fur-seal investigation; voyage to Commander Islands; tabular records of dredging, sounding, and other operations.

112.

1894. RIDGWAY, ROBERT. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXVII. Catalogue of a collection of birds made in Alaska by Mr. C. H. Townsend during the cruise of the U. S. F. C. steamer *Albatross* in the summer and autumn of 1888.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 663-665.

A list of 35 species from localities along the southern side of the Alaska Peninsula.

113.

1894. RIDGWAY, ROBERT. Description of a new storm petrel from the coast of western Mexico.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 687-688.

*Oceanodroma townsendi* described from *Albatross* collections.

114.

1894. PECK, JAMES I. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXVI. Report on the Pteropods and Heteropods collected by the U. S. F. C. steamer *Albatross* during the voyage from Norfolk, Va., to San Francisco, Cal., 1887-88.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 451-466, 3 pls.

Collections from surface and dredging stations; the genera and species are discussed chiefly with reference to their distribution, form, and anatomy, and as bottom deposits.

115.

1894. STEARNS, ROBERT E. C. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXV.—Report on the Mollusk-fauna of the Galapagos Islands, with descriptions of new species.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 353-450, 1 pl., 1 map.

This paper contains chapters on geographical and physical characteristics, origin, distribution, etc. There are supplementary lists of other Galapagos collections, among them a list of 18 new species previously described by Dall from *Albatross* dredgings near the Galapagos Islands. New species: *Bulinulus habeli*, *Onchidium lesliei*, *Nitidella incerta*, *Littorina galapagensis*.

116.

1894. STEARNS, ROBERT E. C. The shells of the Tres Marias and other localities along the shores of Lower California and the Gulf of California.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 139-204.

Based in part on *Albatross* collections.

117.

1894. RATHBUN, RICHARD. A summary of the fishery investigations conducted in the North Pacific Ocean and Bering Sea from July 1, 1888, to July 1, 1892, by the U. S. F. C. steamer *Albatross*.

*Bull. U. S. F. C.* 1892, vol. 12, pp. 127-201, 5 cts.

Contains descriptions of the fishing grounds with the results of the fishing and dredging operations conducted on them; notes on deep-sea explorations; bibliography. The bay and off-shore fishing grounds from Bering Sea to the Gulf of California, with their fisheries, are considered in detail.

118.

1894. RATHBUN, MARY J. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXIV.—Descriptions of new genera and species of crabs from the west coast of North America and the Sandwich Islands.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 223-60.

Six genera and 46 species described as new: *Ericerus*, *Erileptus*, *Ædiplax*, *Scleroplax*, *Opisthopus*, *Cryptophris*, *Ericerus latimanus*, *Podochela tenuipes*, *P.*

118.

1894. RATHBUN, MARY J.—Cont'd.

*mexicana*, *P. lobifrons*, *Erileptus spinosus*, *Anasimus rostratus*, *Inachoides magdalenensis*, *Cyrtomaia smithi*, *Collodes tenuirostris*, *Sphenocarcinus agassizi*, *Euprognatha bifida*, *Pugettia dalli*, *Neorhynchus mexicanus*, *Lambrus exilipes*, *Mesorrhæa gilli*, *Lophozymus frontalis*, *Cycloxanthus californiensis*, *Micropanope polita*, *Menippe convexa*, *Pilodius flavus*, *Pilumnus gonzalensis*, *Nep tunus iridescens*, *Ædiplax granulatus*, *Speocarcinus granulimanus*, *Carcinoplax dentatus*, *Gelasimus gracilis*, *G. latimanus*, *G. coloradensis*, *Brachynotus jouyi*, *Pinnixa occidentalis*, *P. californiensis*, *Cryptophris concharum*, *Scleroplax granulatus*, *Opisthopus transversus*, *Mursia hawaiiensis*, *Platymera californiensis*, *Ebalia americana*, *Myra townsendi*, *M. subovata*, *Nursia tuberculata*, *Randallia distincta*, *Ethusa lata*, *Cymopolia fragilis*, *C. zonata*, *Pachygrapsus longipes*, *Xanthodes minutus*.

119.

1894. RATHBUN, MARY J. Catalogue of the crabs of the family Maiidae in the U. S. National Museum.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 63-103, pls. III-VIII.

Based largely on *Albatross* collections. New genus and species described: *Lep-teces*, *Chionæcetes tanneri*, *Cælocerus grandis*, *Lepteces ornatus*, *Hyastirus caribbaeus*.

120.

1894. McMURRICH, J. PLAYFAIR. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXIII. Report on the Actiniae collected by the *Albatross* during the winter of 1887-88.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 119-216, 17 pls.

Chapters on the classification and geographical and bathymetrical distribution, with descriptions of 7 new genera and 28 new species: *Halcurias*, *Myonanthus*, *Pycnanthus*, *Cymbactis*, *Chitonanthus*, *Cradactis*, *Oractis*, *Edwardsia intermedia*, *Oractis diomedæ*, *Halcurias pilatus*, *Peachia koreni*, *Anemonia variabilis*, *A. inequalis*, *Myonanthus ambiguus*, *Bolocera occidua*, *B. pannosa*, *B. brevicornis*, *Paractis vinosa*, *Actinernus plebeius*, *Actinostola excelsa*, *A. pergamentacea*, *Pycnanthus maliformis*, *Cymbactis feculenta*, *Sagartia lactea*, *S. sancti-matthæi*, *S. paradoxa*, *Adamsia involvens*, *Stephanactis hyalomatidis*, *Leiotelia badia*, *Oulactis californica*, *Cradactis digitata*, *Cerianthus vas*.

121.

1894. **STUDER, THÉOPHILE.** Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* during 1891. X. Note préliminaire sur les Alcyonaires.

*Bull. Mus. Comp. Zool.* 1894, vol. 25, pp. 55-70.

The following species are described as new: *Clavularia gregaria*, *Væringia pacifica*, *Pennatula alata*, *P. distorta pacifica*, *P. kœllikeri*, *Stachytilum superhum*, *Kophobelemnon affine*, *Umbellula geniculata*, *Cladiscus agassizii*, *Distichoptilum verrillii*, *Anthothela argentea*, *Dasygorgia fruticosa*, *Lepidisis inermis*, *Calyptrophora agassizii*, *Stachyodes ambigua*, *Stenella ramosa*, *Amphilaphis abietina*, *Acanthogorgia brevispina*, *Psammogorgia variabilis*, *Callistephanus wrightii*.

122.

1894. **CLARKE, SAMUEL F.** Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* during 1891. XI. The Hydroids.

*Bull. Mus. Comp. Zool.* 1894, vol. 25, pp. 71-78, 5 pls.

The following species are described as new: *Obelia castellata*, *Lictorella geniculata*, *Sertularia variabilis*, *Halecium argenteum*.

123.

1894. **WOODWORTH, W. McM.** Reports on dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* during 1891. IX. Report on the Turbellaria.

*Bull. Mus. Comp. Zool.* 1894, vol. 25, pp. 49-52, 1 pl.

*Stylochoplana californica* and *Prosthecercus panamensis* described as new.

124.

1894. **LUDWIG, HUBERT.** Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by the U. S. F. C. steamer *Albatross* during 1891. XII. The Holothurioidea.

*Mem. Mus. Comp. Zool.* 1894, vol. 17, No. 3, pp. 1-183, 19 pl.

A systematic arrangement of the species, with notes. The following genera and species are described as new: *Synallactes*, *Mesothuria*, *Scotodeima*, *Lætmophasma*, *Capheira*, *Pelagothuria*, *Sphærothuria*, *Pælopatides suspecta*, *Synallactes alexandri*, *S. ænigma*, *Mesothuria multipes*, *Meseres macdonaldi*, *Euphronides tanneri*, *E. verrucosa*, *Psychropotes raripes*, *P. dubiosa*, *Benthodytes incerta*, *Deima pacificum*, *Oneirophanta affinis*, *Scotodeima setigerum*, *Lætmogone theeli*, *Lætmophasma fecundum*, *Capheira sulcata*, *Peniagone intermedia*, *Scotoanassa gracilis*, *Pelagothuria natatrix*, *Phyllophorus aculeatus*, *Psolidium panamense*, *P. gracile*, *Psolus diomedææ*, *P. digitatus*, *P. pauper*, *Sphærothuria bitentaculata*, *Caudina californica*, *Trochostoma granulatatum*, *T. intermedium*, *Ankyroderma spinosum*.

125.

1894. **BERGH, RUDOLPH.** Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross* during 1891. XIII. Die Opisthobranchien.

*Bull. Mus. Comp. Zool.* 1894, vol. 25, pp. 125-233, 12 pl.

A systematic arrangement with descriptions of the following new genera and species: *Geitodoris*, *Gargamella*, *Æolidia herculea*, *Himatella trophina*, *Tritonia diomedea*, *T. exsulans*, *Geitodoris immunda*, *Gargamella immaculata*, *Chromodoris agassizii*, *Tridachia diomedea*, *Doridium purpureum*, *D. diomedum*, *D. ocelligerum*, *Navarchus ænigmaticus*, *Thordisa dubia*, *Gastropteron pacificum*.

126.

1894. McDONALD, MARSHALL. The salmon fisheries of Alaska.

*Bull. U. S. F. C.* 1892, vol. 12, pp. 1-20, 9 pls.

Contains chapters on origin and development of Alaskan salmon fisheries, statistics, present condition, methods, regulations; life history of the salmon by Dr. T. H. Bean; bibliography, etc.

127.

1894. MANN, ALBERT. List of Diatomaceæ from a deep-sea dredging in the Atlantic Ocean off Delaware Bay, by the *Albatross*.

*Proc. U. S. Nat. Mus.* 1893, vol. 16, pp. 308-312.

128.

1894. EIGENMANN, CARL H., and C. H. BEESON. A revision of fishes of the subfamily Sebastinæ of the Pacific coast of America.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 375-407.

Refers to many species brought to light by *Albatross* explorations.

129.

1894. KNOWLTON, F. H. A review of the fossil flora of Alaska, with descriptions of new species.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 207-243, 1 pl.

Based in part on *Albatross* collections. New species described from *Albatross* collections are as follows: *Salix minuta*, *Juglans townsendi*, *Fraxinus herendeenensis*, *Rhus frigida*, *Zizyphus townsendi*, *Phyllites arctica*. An abstract from this paper, entitled "Fossil flora of Alaska," is contained in *Bull. Geol. Soc. Am.*, vol. 5, 1893, pp. 573-590.

130.

1894. ORTMANN, ARNOLD. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the steamer *Albatross* during 1891. XIV. The Pelagic Schizopoda.

*Bull. Mus. Comp. Zool.* 1894, vol. 25, pp. 99-110, 1 pl.

An annotated catalogue with the following species described as new: *Thysanopoda agassizi*, *Euphausia diomedæ*, *Boreomysis californica*.

131.

1894. HICKSON, SYDNEY J. The fauna of the deep sea.

12mo. xvi+169 pp. 23 ills. Appleton's, N. Y. (Modern science series, edited by Sir John Lubbock.)

A condensed presentation of the more important facts respecting deep-sea life; contains references to investigations by steamship *Albatross*.

132.

1895. TANNER, Z. L. Report on the work of the steamer *Albatross* for the year ending June 30, 1893.

*Rep. U. S. F. C.* 1893, part 19, pp. 305-41, 4 pls.

General contents: Fur-seal investigations at Pribilof Islands; pelagic sealing inquiries and patrol of Bering sea; tabular records of operations.

133.

1895. TANNER, Z. L. On the appliances for collecting pelagic organisms, with special reference to those employed by the U. S. Fish Commission.

*Bull. U. S. F. C.* 1894, vol. 14, pp. 143-51, 4 pls.

Descriptions of surface and intermediate towing nets.

134.

1895. TANNER, Z. L. The U. S. Fish Commission and its relations with the U. S. Navy.

*Proc. U. S. Naval Inst.*, 21, No. 1. Whole number 73.

135.

1895. BEAN, BARTON A. Scientific results of explorations by the *Albatross*. XXXIII.—Descriptions of two new flounders.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 633-36.

From *Albatross* dredging stations off Florida. The genus *Gastropsetta* and the species *G. frontalis* and *Cyclopsetta chittendeni* are described as new.

136.

1895. GOODE, G. BROWN, and TARLETON H. BEAN. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXVIII.—On *Cetomimidae* and *Rondeletiidæ*, two new families of bathy-

136.

1895. GOODE, G. BROWN, and TARLETON  
H. BEAN—Continued.

bial fishes from the Northwest-  
ern Atlantic.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp.  
451-54.

Descriptions of genera and species:  
*Cetomimus*, *Rondeletia*, *Cetomimus gil-*  
*lii*, *C. storeri*, *Rondeletia bicolor*.

137.

1895. GOODE, G. BROWN, and TARLETON  
H. BEAN. Scientific results of  
explorations by the U. S. F. C.  
steamer *Albatross*. XXIX.—A  
revision of the order Heteromi,  
deep-sea fishes, with a descrip-  
tion of the new generic types,  
*Macdonaldia* and *Lipogenys*.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp.  
455-70.

Descriptions of new genera and spe-  
cies, with analytical keys: *Gigliolia*,  
*Macdonaldia*, *Lipogenys*, *Gigliolia mose-*  
*leyi*, *Lipogenys gillii*.

138.

1895. GOODE, G. BROWN, and TARLETON  
H. BEAN. Scientific results of  
explorations by the U. S. F. C.  
steamer *Albatross*. XXX.—On  
*Harriotta*, a new type of Chimæ-  
roid fish from the deep waters  
of the Northwestern Atlantic.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp.  
471-73, 1 pl.

Description of a new genus and spe-  
cies: *Harriotta raleighana*.

139.

1895. GOODE, GEORGE BROWN, and  
TARLETON H. BEAN. Oceanic  
ichthyology, a treatise on the  
deep-sea and pelagic fishes of  
the world, based chiefly upon the  
collections made by the steam-  
ers *Blake*, *Albatross*, and *Fish*  
*Hawk*, in the northwestern At-  
lantic, with an atlas containing  
417 figures.

*Spec. Bull. U. S. Nat. Mus.* xxxv+  
553 pp. Atlas, xxiii+26 pp., 123  
pls.

An elaborate work, presenting a dis-  
cussion of all deep-sea and pelagic fishes  
dwelling in the open ocean, either at the  
surface or at bottom, beyond a depth  
of 500 feet; separate volume of plates.  
List of genera and species here de-

139.

1895. GOODE, GEORGE BROWN, and  
TARLETON H. BEAN—Cont'd.

scribed as new: *Abyssicola*, *Æthoprora*,  
*Alcockia*, *Aldrovandia*, *Bathylaco*, *Ben-*  
*thocometes*, *Bonapartia*, *Caulophryne*,  
*Celema*, *Cetomimus*, *Colletia*, *Conocara*,  
*Dicromita*, *Electrona*, *Gigliolia*, *Gram-*  
*matostomias*, *Harriotta*, *Helicolenus*,  
*Hypoclydonia*, *Lampadena*, *Mæbia*,  
*Moseleya*, *Penopus*, *Rondeletia*, *Stein-*  
*dachneria*, *Yarrella*, *Macdonaldia*, *Scyl-*  
*liorhinus profundorum*, *Harriotta ra-*  
*leighana*, *Conocara macdonaldi*, *Bathy-*  
*troctes antillarum*, *B. æquatoris*, *Argen-*  
*tina striata*, *Bathylagus euryops*, *B. bene-*  
*dicti*, *Bathylaco nigricans*, *Chlorophthal-*  
*mus trunculentus*, *Rondeletia bicolor*, *Ce-*  
*tomimus gillii*, *C. storeri*, *Myctophum*  
*opalinum*, *M. remiger*, *Lampanyctus ala-*  
*tus*, *L. guntheri*, *L. gemmifer*, *L. lacerta*,  
*Notoscopeus quercinus*, *N. margaritif-*  
*erus*, *N. castaneus*, *Lampadena speculi-*  
*gera*, *Æthoprora lucida*, *Æ. effulgens*,  
*Nannobrachium macdonaldi*, *Bonapar-*  
*tia pedaliota*, *Yarrella blackfordi*, *As-*  
*tronesthes gemmifer*, *Echiostoma marga-*  
*rita*, *Grammatostomias dentatus*, *Photo-*  
*nectes gracilis*, *Halosaurus guntheri*, *Al-*  
*drovandia gracilis*, *A. pallida*, *Conger-*  
*muræna flava*, *Hoplunnis diomedianus*,  
*Pisodonophis cruentifer*, *Gigliolia mo-*  
*seleyi*, *Lipogenys gillii*, *Stephanoberyx*  
*gillii*, *Bathylclupea argentea*, *Dicrotus*  
*parvipinnis*, *Benthodesmus atlanticus*,  
*Cyttus hololepis*, *Epigonus occidentalis*,  
*Hypoclydonia bella*, *Scorpena cristu-*  
*lata*, *S. agassizii*, *Helicolenus maderen-*  
*sis*, *Pontinus rathbuni*, *P. macrolepis*, *P.*  
*longispinis*, *Paraliparis copei*, *Calliony-*  
*mus himantophorus*, *Lycodes zoarchus*,  
*Dicromita agassizii*, *Bassogigas gillii*,  
*Penopus macdonaldi*, *Phycis cirratus*,  
*Læmonema melanurum*, *Chalinura brev-*  
*ibarbis*, *Steindachneria argentea*, *Prio-*  
*notus militaris*, *P. egretta*, *P. beanii*, *Per-*  
*istedion gracile*, *Caulophrynejordani*.

139.

1895. The same. *Smithsonian Contrib.*  
to Knowl. Vol. XXX, pp.  
XXXV+553; Vol. XXXI, pp.  
XXII+26 pp., 123 pls.

This work was also published in the  
Memoirs of the Museum of Compara-  
tive Zoology as vol. 22, "in connection  
with the National Museum and the  
Smithsonian Institution," and dated  
September, 1896.

140.

1895. GOODE, G. BROWN, and TARLETON  
H. BEAN. New deep-sea fishes.

*Am. Nat.*, vol. 29, pp. 281.

A notice of the author's paper in *Proc.*  
*U. S. Nat. Mus.*, vol. 17, 1894.



## 140a.

1895. GOODE, G. BROWN, and TARLETON H. BEAN. More deep-sea fishes. *Am. Nat.*, vol. 29, pp. 376, 3 pls.

A reference to the above, with plates and additional remarks.

## 141.

1895. GILBERT, CHARLES H. The ichthyological collections of the steamer *Albatross* during the years 1890 and 1891.

*Rep. U. S. F. C. 1893*, part 19, pp. 393-476, 16 pls.

The fishes were collected in Bering Sea and the North Pacific Ocean, along the coasts of Alaska, Washington, and California, and are from shore and dredging stations. A systematic arrangement of the species; the following genera and species described as new: *Elanura*, *Rhinoliparis*, *Gyrinichthys*, *Bathyphasma*, *Lethotremus*, *Lyconectes*, *Derepodichthys*, *Raja abyssicola*, *R. aleutica*, *Bathylagus borealis*, *Sebastolobus altivelis*, *Icelus vicinalis*, *I. canaliculatus*, *I. spiniger*, *Icelinus borealis*, *Arteidiellus pacificus*, *Cottus aleuticus*, *Acanthocottus sellaris*, *A. laticeps*, *A. profundorum*, *Triglops beani*, *T. scepticus*, *T. xenostethus*, *Elanura forficata*, *Oligocottus acuticeps*, *Paricelinus thoburni*, *Aspidophoroides bartoni*, *Odontopyxis frenatus*, *O. leptorhynchus*, *Xenochirus alascanus*, *Paraliparis holomelas*, *P. ulochir*, *Careproctus ectenes*, *C. colletti*, *C. phasma*, *C. ostentum*, *C. simus*, *Gyrinichthys mnyrtremus*, *Rhinoliparis barbifer*, *Liparis cyclostigma*, *L. fucensis*, *Leptoblennius mackayi*, *Bathyphasma ovigerum*, *Lethotremus muticus*, *Lyconectes aleutensis*, *Lycodes palearis*, *Lycodapus extensus*, *L. parviceps*, *Derepodichthys alepidotus*, *Nematonurus cyclolepis*, *Chalinura filifera*, *Limanda proboscidea*.

## 142.

1895. DALL, WILLIAM HEALEY. Scientific results of explorations by U. S. F. C. steamer *Albatross*. XXXIV. Report on Mollusca and Brachiopoda dredged in deep water, chiefly near the Hawaiian Islands, with illustrations of hitherto unfigured species from Northwest America.

*Proc. U. S. Nat. Mus. 1894*, vol. 17, pp. 675-733, 10 pls.

Twenty-eight species are described as new, a few being discussed anatomically at considerable length. New species as follows: *Scaphander alatus*, *Sabatia pustulosa*, *Pleurotoma micros-*

## 142.

1895. DALL, WILLIAM HEALEY—Cont'd. *celida*, *Pleurotomella gypsina*, *Liothyryna clarkeana*, *P. hawaiiiana*, *P. climacella*, *Spergo glandiniformis*, *S. daphnelloides*, *Lunatia sandwichensis*, *Solarrella reticulina*, *Emarginula hawaiiensis*, *Dentalium phaneum*, *D. complexum*, *Euciroa pacifica*, *Lyonsiella alaskana*, *Pectunculus arcodentiens*, *Buccinum aleuticum*, *B. ovulum*, *Chrysodomus insularis*, *C. magnus*, *Beringius frielei*, *B. aleuticus*, *Frieleia halli*, *Hemithyris becheri*, *H. craneana*, *Macandrevia americana*, *M. craniella*, *M. diamantina*.

## 143.

1895. DALL, W. H. Synopsis of a review of the genera of recent and Tertiary Mactridæ and Mesodesmatidæ.

*Proc. Malacological Soc. (Lond.)*, vol. 1, pt. 5, Mar., pp. 203-213.

Based in part on *Albatross* collections.

## 144.

1895. DALL, W. H. New species of land shells from Galapagos Islands.

*The Nautilus*, vol. 8, May, No. 11, pp. 126-127.

The following species from *Albatross* collections are described as new: *Bulimulus reibischii*, *B. tanneri*.

## 145.

1895. COPE, E. D. On some new North American snakes.

*Am. Nat.*, vol. 29, pp. 676-680.

The following, derived partly from *Albatross* collections, are described as new: *Natrix compressicauda teniata*, *N. fasciata pictiventris*, *Seminatrix pygæus*, *Zamenis stejnegerianus*, *Z. conirostris*, *Z. lateralis fuliginosus*.

## 146.

1895. BENEDICT, JAMES E. Scientific results of explorations by the steamer *Albatross*. XXXI. Descriptions of new genera and species of crabs of the family Lithodidæ, with notes on the young of *Lithodes camtschaticus* and *Lithodes brevipes*.

*Proc. U. S. Nat. Mus. 1894*, vol. 17, pp. 478-88.

Collections from shore and dredging stations chiefly in the North Pacific Ocean and Bering Sea. Four genera and 11 species are described as new: *Leptolithodes*, *Pristopus*, *Ædignathus*, *Lepeopus*, *Lithodes goodei*, *L. diomedæ*, *L. æquispinus*, *L. couesi*, *L. rathbuni*, *L. californiensis*, *Leptolithodes multispinus*, *L. papillatus*, *Pristopus verrilli*, *Ædignathus gilli*, *Lepeopus forcipatus*.



147.

1895. BIGELOW, ROBERT PAYNE. Scientific results of explorations by the U. S. F. C. steamer *Albatross*. XXXII. Report on the Crustacea of the order Stomatopoda collected by the steamer *Albatross* between 1885 and 1891, and on other specimens in the U. S. National Museum.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 489-550, 8 pls.

Collections from the Atlantic and Pacific shore and dredging stations. The paper contains classification, with analytical keys, bibliography, and descriptions of the genus *Odontodactylus* and 14 species originally described in *Circ. Johns Hopk. Univ.* 88, 1891; 106, 1893: *Gonodactylus spinosus*, *Odontodactylus havanensis*, *Pseudosquilla megalopthalma*, *Lysiosquilla biminensis*, *Squilla quadridens*, *S. polita*, *S. parva*, *S. mantoidea*, *S. aculeata*, *S. panamensis*, *S. intermedia*, *S. biformis*, *S. alba*, *S. rugosa*.

148.

1895. GIESBRECHT, WILHELM. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, carried on by *Albatross*, during 1891. XVI. Die Pelagischen Copepoden.

*Bull. Mus. Comp. Zool.* 1895, vol. 25, pp. 243-263, 4 pls.

The following genera and species are described as new: *Gaidius*, *Lopothrix*, *Gaidius pungens*, *Chirundina streetsii*, *Lopothrix frontalis*, *Centropages elegans*, *Euchæta tonsa*, *Scolecithrix cristata*, *S. persecans*, *Leuckartia grandis*, *Heterochæta tanneri*, *Pontella agassizii*.

149.

1895. FAXON, WALTER. Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, by the steamer *Albatross*, during 1891. XV. The Stalk-eyed Crustacea.

*Mem. Mus. Comp. Zool.* 1895, vol. 18, pp. 1-292, 67 pls.

A systematic account of the species with special chapters on distribution, colors, bathymetric range, etc. Many of the plates are colored.

150.

1895. MULLER, G. W. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to west coast of Mexico, and in the Gulf of California, carried on by U. S. F. C. steamer *Albatross*, during 1891. XIX. Die Ostracoden.

*Bull. Mus. Comp. Zool.* 1895, vol. 27, pp. 153-170, 3 pls.

The genus *Gigantocypris* and species *Gigantocypris pellucida*, *Conchæcia agassizii* described as new.

151.

1895. HARTLAUB, C. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, carried on by the steamer *Albatross*, during 1891. XVIII. Die Comatuliden.

*Bull. Mus. Comp. Zool.* 1895, vol. 27, pp. 137-152, 4 pls.

The new species described are as follows: *Antedon agassizii*, *A. tanneri*, *A. parvula*, *A. brigadata*, *A. subtilis*.

152.

1895. TOWNSEND, C. H. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to the west coast of Mexico, and in the Gulf of California, carried on by the U. S. F. C. steamer *Albatross*, during 1891. XVII. Birds from Cocos and Malpelo islands, with notes on petrels obtained at sea.

*Bull. Mus. Comp. Zool.* 1895, vol. 27, pp. 121-126, 2 pls.

The ornithological relationship of Cocos Island with the Galapagos and with the mainland is referred to. Eleven species are considered, and the following genera and species from Cocos Island are described as new; *Cocornis agassizii*, *Nesotriccus ridgwayi*.

152a.

1895. Fur Seal Arbitration. Proceedings of the Tribunal of Arbitration convened at Paris.

*Sen. Ex. Doc.* 177, 53d Cong., 2d sess., 15 vols.

Contains much matter based on *Albatross* investigations.

153.

1895. RATHBUN, MARY J. Descriptions of a new genus and four new species of crabs from the Antillean region.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 83-86.

Three species based on *Albatross* collections. The following are described as new: *Thyrolambrus*, *Thyrolambrus astroides*, *Solenolambrus decemspinus*, *Pilumnus diomedææ*, *Actæa palmeri*.

154.

1895. RATHBUN, MARY J. Notes on the crabs of the family Inachidæ in the U. S. National Museum.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 43-75, 1 pl.

Based largely on *Albatross* dredgings. New genera and species described: *Holoplites*, *Echinæcus*, *Achæus trituberculatus*, *Podichela spinifrons*, *Collodes leptochæles*, *Batrachonotus brasiliensis*, *B. nicholsi*, *Inachoides intermedius*, *Anasimus latus*, *Echinæcus pentagonus*.

155.

1895. RATHBUN, MARY J. The genus *Callinectes*.

*Proc. U. S. Nat. Mus.* 1895, vol. 18, pp. 349-375.

Based partly on *Albatross* collections. *Callinectes sapidus acutidens* described as new.

156.

1895. VERRILL, A. E. Descriptions of new species of starfishes and Ophiurans, with a revision of certain species formerly described; mostly from collections made by the U. S. Commission of Fish and Fisheries.

*Proc. U. S. Nat. Mus.* 1894, vol. 17, pp. 245-297.

Based chiefly on *Albatross* dredgings. New genera and species: *Isaster*, *Acantharchaster*, *Pseudarchaster concinnus*, *Isaster bairdii*, *Pentagonaster eximius*, *Neomorphaster forcipatus*, *Solaster syrtensis*, *S. benedicti*, *Crossaster helianthus*, *Pteraster hexactis*, *Cribrella pectinata*, *Brisinga multicostata*, *Freyella aspera*, *F. microspina*, *Ophioglypha saurura*, *O. tessellata*, *O. grandis*, *Astrochema clavigera*.

157.

1895. VERRILL, A. E. Distribution of the Echinoderms of Northeastern America. [Brief contributions to zoology from museum of Yale College, No. LVIII.]

*Am. Jour. Sci.* 1895, Third Series, vol. 49, No. 290, Feb., pp. 127-141. (Abstract of a paper read before the National Academy of Science, Dec. 31, 1894.)

The same (continuation).

*Am. Jour. Sci.*, Third Series, vol. 49, No. 291, Mar., 1895, pp. 199-212.

Based in part on *Albatross* dredgings. Contains notes on bathymetric distribution. The genus *Lophopteraster* and the following species described as new: *Pentagonaster simplex*, *P. planus*, *Porania insignis*, *Rhegaster abyssicola*, *Lophopteraster abyssorum*, *Hymenaster regalis*, *Asterias enopla*, *A. austera*, *Lepasterias hispidella*.

158.

1895. VERRILL, A. E. Supplement to the Marine Nemerteans and Planarians of New England.

*Trans. Conn. Acad. of Arts and Sciences* 1895, vol. 9, pp. 523-534.

An annotated list, *Micrura cæca* described as a new species.

159.

1896. TANNER, Z. L., and F. J. DRAKE. Report upon the operations of the U. S. F. C. steamer *Albatross* for the year ending June 30, 1894.

*Rep. U. S. F. C.* 1894, part 20, pp. 197-278, 2 pls., cht.

Fur-seal investigations at Pribilof Islands; fishery investigations and the patrol of Bering Sea; fishery investigations in Puget Sound and off southern California; report of fishery expert; tabular records of hydrographic and other operations.

160.

1896. DRAKE, F. J., Lieut. Commander U. S. N. Report upon the investigations of the steamer *Albatross* for the year ending June 30, 1895. (Abstract.)

*Rep. U. S. F. C.* 1895, part 21, pp. 125-168.

General contents: Fur-seal investigations at Pribilof and Commander islands; pelagic sealing investigations and patrol of Bering Sea; report of fishery expert; records of operations.

161.

1896. DALL, W. H. Insular land-shell faunas, especially as illustrated by the data obtained by Dr. G. Baur in the Galapagos Islands.

*Proc. Acad. Nat. Sci. Phil.* 1896, Aug., pp. 395-459, 3 pls.

Based in part on *Albatross* collections. The following species are described as new: *Bulimulus nesioticus*, *B. sp.*

162.

1896. JORDAN, DAVID STARR, et al. Observations on the fur seals of the Pribilof Islands. Preliminary Report.

*Treas. Dept. Doc. No. 1913*, 69 pp., chart.

A preliminary report by the commission of investigation into the condition of the fur-seal fisheries. See Nos. 186, 187. The *Albatross* was detailed for this work.

163.

- 1896-1900. JORDAN, DAVID STARR, and BARTON WARREN EVERMANN. Fishes of North and Middle America. A descriptive catalogue of the species of fish-like vertebrates found in the waters of North America north of the Isthmus of Panama.

*Bull. 47, U. S. Nat. Mus.*, Parts I-IV, lviii+3313 pp., 392 pls.

The most valuable representation of our knowledge of the fauna in question. Contains descriptions of nearly all fishes brought to light by the investigations of the steamship *Albatross*. Genera and species from *Albatross* collections here described as new are as follows: *Palometa*, *Enneistus*, *Xystroperca*, *Alcidea*, *Archistes*, *Stelgistrum*, *Sternias*, *Orycottus*, *Nautiscus*, *Bryosophilus*, *Embryx*, *Albatrossia*, *Bogoslovius*, *Verasper*, *Ranularia*, *Perissias*, *Crystallichthys*, *Prognurus*, *Leuresthes crameri*, *Mugil thoburni*, *Archistes plumarius*, *Radulinus boleoides*, *Stelgistrum stejneri*, *Nautiscus pribilovius*, *Podothecus hamlini*, *P. thompsoni*, *Averrun-cus sterletus*, *Gnathypops snyderi*, *Hippoglossoides hamiltoni*, *Verasper moseri*, *Osmerus albatrossis*, *Bathylagus milleri*, *Oligoplites mundus*, *Crystallichthys mirabilis*, *Prognurus cypselurus*, *Larimus acclivus*, *Iridio kirschii*, *Sebastodes aleutianus*.

164.

1896. TOWNSEND, C. H., F. W. TRUE, and A. B. ALEXANDER. Reports of agents, officers, and persons acting under the authority of the Secretary of the Treasury in relation to the condition of seal life on the rookeries of the Pribilof Islands, and to pelagic sealing in Bering Sea and the North Pacific Ocean, 1883-1895. Part II.—Condition of seal life on the rookeries of the Pribilof Islands, 1893-1895.

*Senate Doc. No. 137*, part 2, 54th Cong., 1st sess., 154 pp., 19 pls., 11 charts; atlas of 46 pls.

Reports on fur-seal fisheries, made in connection with the work of the steamship *Albatross*.

165.

1896. VERRILL, A. E. The *Opisthoteuthidæ*, a remarkable new family of deep-sea Cephalopoda, with remarks on some points in molluscan morphology.

*Am. Jour. Sci.* 1896, fourth series, vol. 2, No. 7—July, pp. 74-80, 7 figs.

A second specimen of *Opisthoteuthis agassizii* noted as dredged by the *Albatross*.

166.

1896. DALL, W. H. Diagnoses of new species of Mollusks from the west coast of America.

*Proc. U. S. Nat. Mus.* 1895, vol. 18, pp. 7-20.

Based on *Albatross* collections. New species here described: *Calliostoma iridium*, *C. turbinum*, *Anaplocamus borealis*, *Solariella nuda*, *S. ceratophora*, *Rimula expansa*, *Emarginula flabellum*, *Choristes carpenteri*, *Benthodolium pacificum*, *Phos cocosensis*, *Cominella brunneocincta*, *Fusus rufocaudatus*, *Tractolira sparta*, *Scaphella benthalis*, *Cancel-laria centrola*, *C. io*, *Pleurotoma aulaca*, *Pleurotomella castanea*, *Nucula iphigenia*, *Limopsis compressus*, *Philobrya atlantica*, *Callocardia lepta*, *C. ovalis*, *C. gigas*, *Callogonia angulata*, *Periploma stearnsii*, *P. carpenteri*.

167.

1896. GOES, AXEL. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of

167.

## 1896. GOES, AXEL—Continued.

Mexico, and in the Gulf of California, carried on by the U. S. F. C. steamer *Albatross*, during 1891. XX. The Foraminifera.

*Bull. Mus. Comp. Zool.* 1896, vol. 20, pp. 1-103, 9 pls.

An annotated catalogue, with synonymy and descriptions of new species; a list of stations; a table showing bathymetric distribution and a comparison of the faunas on both sides of the Isthmus of Panama. The following are described as new: *Astrorhiza furcata*, *A. tenuis*, *A. vermiformis*, *Orithionina pisum*, *C. rugosa*, *C. lens*, *C. granum sub simplex*, *Thurammina erinacea*, *Reophax insectus*, *R. armatus*, *R. turbo*, *Haplophragmium helicoideum*, *H. obsoletum*, *H. lituolnoides*, *Verneuilina pusilla*, *Textularia solita inflata*.

168.

## 1896. TOWNSEND, C. H. Description of a closing tow net for submarine use at all depths.

*Rept. U. S. F. C.* 1894, part 20, pp. 279-282, 2 pls.

A new and simple form of towing net for exploring at intermediate depths, the jaws of the net closing by means of a messenger.

168a.

## 1896. ELLIOTT, D. G. Descriptions of an apparently new species and subspecies of ptarmigan from the Aleutian Islands.

*The Auk*, vol. 13, pp. 24-29, 1 pl.

Based chiefly on *Albatross* collections. *Lagopus evermanni* and *L. rupestris townsendi* described as new.

169.

1897. TANNER, Z. L., Commander, U. S. Navy. Deep-sea exploration: A general description of the steamer *Albatross*, her appliances and methods.

*Bull. U. S. F. C.* 1896, vol. 16, pp. 257-424, 40 pls., 76 figs.

A valuable work, describing in detail the methods of operating the many appliances used in connection with deep-sea investigations. Contains chapters on the construction of the vessel, deep-sea sounding, thermometers, density of sea water, development of deep-sea exploration, navigation, the conduct of deep-sea work, marine deposits, preservation of collections, etc.

170.

## 1897. GILBERT, C. H., and FRANK CRAMER. Report on the fishes dredged in deep water near the Hawaiian Islands, with descriptions and figures of 23 new species.

*Proc. U. S. Nat. Mus.* 1896, vol. 19, pp. 403-435.

Includes a description of the remarkable genus *Pelecanichthys*. New genera and species: *Argyripnus*, *Ceelocephalus*, *Pelecanichthys*, *Promyllantor alcocki*, *Conger muraena aquorea*, *Chlorophthalmus proridens*, *Diaphus urolampus*, *D. chrysorhynchus*, *Myctophum flbulatum*, *Dasy Scopelus pristilepis*, *Argyripnus ephippiatus*, *Melanostoma argyreum*, *Scorpaena remigera*, *Peristedion hians*, *Ceolorhynchus gladius*, *Macrourus ectenes*, *M. propinquus*, *M. holocentrus*, *M. gibber*, *Hymenocephalus antraxus*, *Trachonurus sentipellis*, *Chalinura ctenomelas*, *Optonurus atherodon*, *Pelecanichthys crumenalis*, *Malthopsis mitrifer*, *Ceelocephalus acipenserinus*.

171.

1897. GILBERT, CHARLES HENRY. Descriptions of 22 new species of fishes collected by the steamer *Albatross*.

*Proc. U. S. Nat. Mus.* 1896, vol. 19, pp. 437-457

Collections from the North Pacific Ocean between Panama and California. One species from Brazil. New genera and species: *Emmion*, *Ulvicola*, *Tachysurus liropus*, *Netuma insularum*, *Mugil thoburni*, *Myripristis clarionensis*, *Epinephetus niphobles*, *Orthopristis forbesi*, *Ophioscion strabo*, *Holacanthus iodocus*, *Scorpaena pannosa*, *Sebastodes semicinctus*, *S. ayresii*, *S. cramerii*, *Prionotus loxias*, *Astroscopus zephyrtius*, *Emblemaria oculocirris*, *Lepidion verecundum*, *Paralichthys woolmani*, *Emmion bristolae*, *Leuresthes cramerii*, *Centropomus constantinus*, *Ulvicola sanctae-rosae*.

172.

1897. BENEDICT, JAMES E. A revision of the genus *Synidotea*.

*Proc. Acad. Nat. Sci. Phil.* 1897, pp. 389-404, 13 cuts.

Based in part on *Albatross* collections. Contains an analytical key to species. The following are described as new: *Synidotea laticauda*, *S. nebulosa*, *S. angulata*, *S. pallida*, *S. erosa*, *S. laevis*, *S. picta*.

173.

1897. RICHARDSON, HARRIET. Description of a new genus and species of Sphæromidæ from Alaskan waters.

*Proc. Biol. Soc. Wash.* 1897, vol. 11, pp. 181-183.

*Tecticeps alascensis*, from Albatross collections, is described as new.

174.

1897. DALL, W. H. Notice of some new or interesting species of shells from British Columbia and the adjacent region.

*Nat. Hist. Soc. B. C.*, Bull. No. 2, pp. 1-18, pl. 1-2.

Based in part on Albatross collections. The following described as new: *Crenella columbiana*, *C. leana*, *C. japonica*, *Modiolaria taylori*, *M. seminuda*, *Nucula carlottensis*, *Leda extenuata*, *Yoldia ensifera*, *Y. martyria*, *Malletia faba*, *M. gibbsii*, *M. pacifica*, *M. kennerlyi*, *Macoma inflatula*, *M. liotricha*, *Cadulus hepburni*, *C. tolmiei*, *Cythara victoriana*, *Mumiola tenuis*, *Rissoina newcombei*, *Molleria quadrae*, *Eucosmia lurida*.

175.

1897. MERRIAM, C. HART. A new fur seal or sea bear (*Arctocephalus townsendi*) from Guadalupe Island, off Lower California.

*Proc. Biol. Soc. Wash.* 1897, vol. 11, pp. 175-178.

This paper is based on collections and notes made by the resident naturalist of the Albatross, on a side trip, during the detail of the vessel for investigations of the seal fisheries.

176.

1897. GILL, THEO., and C. H. TOWNSEND. Diagnoses of new species of fishes found in Bering Sea.

*Proc. Biol. Soc. Wash.* 1897, vol. 11, pp. 231-234.

Descriptions of 14 new species and 1 new genus of fishes obtained by Mr. Townsend as naturalist of the Albatross in 1895. The new species are *Raia rospinis*, *R. obtusa*, *R. interrupta*, *Macdonaldia alta*, *M. longa*, *Ericara salmona*, *Lycodes digitatus*, *L. concolor*, *Macrurus lepturus*, *M. dorsalis*, *M. firmisquamis*, *M. magnus*, *M. suborbitalis*, *Hippoglossoides robustus*. The new genus described is *Ericara* of Alepocephalidæ.

177.

1897. VERRILL, A. E., and KATHARINE J. BUSH. Revision of the genera of Ledidæ and Nuculidæ of the Atlantic coast of the United States. [Brief contributions to zoology from the museum of Yale University, No. L.]

*Am. Jour. Sci.* 1891, 4th series, vol. 3, No. 13, Jan., pp. 51-63, 21 figs.

Based in part on Albatross collections. The new genera and species described are *Ledella*, *Megayoldia*, *Orthoyoldia*, *Yoldiella*, *Microyoldia*, *Tindariopsis*; *Ledella parva*, *Yoldiella inflata*, *Neilonella subovata*, *Tindaria callistiformis*.

178.

1897. RIDGWAY, ROBERT. Birds of the Galapagos Archipelago.

*Proc. U. S. Nat. Mus.* 1896, vol. 19, pp. 459-670.

Embodies practically all that is known of the avifauna of the Galapagos. Contains analytical keys, lists of species known to each island of the archipelago, maps showing distribution of species, bibliography, etc.

179.

1897. MAAS, OTTO. Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, by the Albatross, in 1891. XXI. Die Medusen.

*Mem. Mus. Comp. Zool.* 1897, vol. 32, pp. 7-92, 14 pls., 1 map.

A systematic arrangement of the species, with notes. The genus *Chiarella* and the following species are described as new: *Stomotoca divisa*, *Chiarella centripetalis*, *Melicertum proboscifer*, *Homæonema typicum*, *Aglaura prismatica*, *Atolla gigantea*, *A. alexandri*, *Charybdea arborifera*, *Nauphantia albatrossi*.

180.

1897. HANSEN, H. J. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, carried on by the U. S. F. C. steamer Albatross, during 1891. XXII. The Isopoda.

*Bull. Mus. Comp. Zool.* 1897, vol. 31, pp. 93-130, 6 pls., chart.

The following genera and species are described as new: *Cryptique*, *Munidion*,



180.

## 1897. HANSEN, H. J.—Continued.

*Parargeia*, *Bathygyge*; *Eurycope pulchra*, *E. scabra*, *Æga maxima*, *A. acuminata*, *A. plebeia*, *A. longicornis*, *Rocinela laticauda*, *R. modesta*, *Irona foveolata*, *Cryptionella elongata*, *Munidion princeps*, *Pseudionella galacanthæ*, *Parargeia ornata*, *Bathygyge grandis*.

181.

1897. RATHBUN, MARY J. Synopsis of the American species of *Ethusa*, with description of a new species.

*Proc. Biol. Soc. Wash.* 1897, vol. 11, pp. 109-110.

*Ethusa tenuipes* is described as new.

182.

1897. RATHBUN, MARY J. Synopsis of the American species of *Palicus Philippi* (= *Cymopolia roux*), with descriptions of six new species.

*Proc. Biol. Soc. Wash.* 1897, vol. 11, pp. 93-99.

Based partly on *Albatross* collections. New species described: *Palicus alternatus*, *P. faxoni*, *P. isthmus*, *P. angustus*, *P. depressus*, *P. bahamensis*.

183.

1898. AGASSIZ, A. Reports on dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, carried on by the steamer *Albatross* during 1891. XXIII. Preliminary report on the Echini.

*Bull. Mus. Comp. Zool.* 1898, vol. 32, pp. 69-86, 13 pls., chart.

The following new genera and species are described: *Dialithocidaris*, *Dermatodiadema*, *Plexechinus*, *Phrissocystis*, *Spatagodesma*; *Dorocidaris panamensis*, *Goniocidaris doederleini*, *Porocidaris milleri*, *P. cobosi*, *Salenia miliaris*, *Dialithocidaris gemmifera*, *Dermatodiadema globulosum*, *D. horridum*, *Phormosoma panamensis*, *P. hispidum*, *Pourtalesia tanneri*, *Plexechinus cinctus*, *Echinocrepis setigera*, *Urechinus giganteus*, *Cystechinus loveni*, *C. rathbuni*, *Phrissocystis aculeata*, *Homolampas hastata*, *Aerope fulva*, *Schizaster latifrons*, *S. townsendi*, *Periaster tenuis*, *Brissopsis columbaris*, *Toxobrissus pacificus*.

184.

1898. BENEDICT, JAMES E. The *Arcturidæ* in the U. S. Nat. Mus.

*Proc. Biol. Soc. Wash.*, vol. 12, pp. 41-51.

Based in part on *Albatross* collections. The following species are described as new: *Arcturus longispinis*, *A. glabrus*, *A. beringanus*, *A. tenuispinis*, *A. multispinis*, *A. murchisoni*, *Astacilla diomedæ*, *A. cæca*.

185.

1898. DRAKE, F. J. Records of observations made on board the U. S. F. C. steamer *Albatross* during the year ending June 30, 1896.

*Rep. U. S. F. C.* 1896, part 22, pp. 357-386.

An abstract from the report of the commanding officer. General contents: Fur-seal investigations at Pribilof and Commander islands; pelagic sealing inquiries and patrol of Bering Sea; fishery investigations in Puget Sound and off southern California; tabular records of dredging and other operations.

186.

## 1898. JORDAN, DAVID STARR, et al. Second preliminary report of the Bering Sea fur-seal investigations, 1897.

*Treas. Dept. Doc. No.* 1994, 48 pp.

A preliminary report. See No. 187. The *Albatross* was detailed for these investigations.

187.

## 1898-99. JORDAN, DAVID STARR, et al. The fur seals and fur-seal islands of the North Pacific Ocean. By D. S. Jordan, with the following official associates: Leonhard Stejneger, Frederic A. Lucas, Jefferson F. Moser, C. H. Townsend, G. A. Clark, Joseph Murray.

*Treas. Dept. Doc. No.* 2017, pts. 1 to 4; many illustrations; charts.

The report of an inquiry into the condition and needs of the fur-seal herds of North Pacific Ocean and Bering Sea. An exhaustive study of the fur seals and fur-seal fisheries. Part 3 contains many special papers on natural history, based on the investigations of the *Albatross*, which was detailed for the use of the commission. Those in which new marine species are described are:

The species of *Callorhinus*. By D. S.



187.

## 1898-99. JORDAN, DAVID S.—Cont'd.

Jordan and G. A. Clark. *C. alascanus* and *C. curilensis* are described as new.

*Tunicates of the Pribilof Islands.* By W. E. Ritter. New species: *Styela greeleyi*, *Dendrodia tuberculata*, *D. subpedunculata*, *Polyclinum globosum*, *P. pannosum*, *Aplidiopsis jordani*, *Amaroucium kincaidi*, *A. pribilovense*, *A. snodgrassi*, *Synoicum irregulare*.

*List of crustacea known to occur on or near the Pribilof Islands.* By M. J. Rathbun. New species: *Crangon communis*, *Nectocrangon crassa*, *Spirontocaris barbata*, *S. avina*.

*The fishes of Bering Sea.* By D. S. Jordan and C. H. Gilbert. New genera and species: *Archistes*, *Stelgistrum*, *Crystallichthys*, *Prognurus*, *Verasper*, *Osmernus albatrossis*, *Therobromus callorhini*, *Sebastodes aleutianus*, *Archistes plumarius*, *Stelgistrum steinegeri*, *Ceratocottus lucasi*, *Myoxocephalus mednisi*, *Nautiscus pribilovius*, *Podothecus hamlini*, *P. thompsoni*, *Crystallichthys mirabilis*, *Prognurus cypselurus*, *Bogoslovius clarki*, *Hippoglossoides hamiltoni*, *Verasper moseri*.

188.

## 1898. RATHBUN, MARY J. The Brachyura of the biological expedition to the Florida Keys and the Bahamas in 1893.

*Bull. Lab. Nat. Hist. Univ. of Iowa*, vol. 4, pp. 250-294, pls. 1-9.

Based in part on *Albatross* collections. The following genera and species are described as new: *Lophopanopeus*, *Eupanopeus*, *Tetraxanthus*, *Chasmocarcinus*, *Collodes armatus*, *Actæa bifrons*, *Pilumnus spinosissimus*, *P. andrewsii*, *P. holosericus*, *Xanthias nuttingi*, *Micropanope truncatifrons*, *Hypopeltarium dextrum*, *Trachycarcinus spinulifer*, *Pilumnoplax americanus*, *Chasmocarcinus typicus*, *C. obliquus*, *Frevillea quadridentata*, *Calappa sulcata*, *Spelæophorus elevatus*, *Iliacantha liodactylus*, *Cyclo-dorippe granulata*.

189.

## 1898. VERRILL, ADDISON E., and KATHARINE J. BUSH. Revision of the deep-water Mollusca of the Atlantic coast of North America, with descriptions of new genera and species. Part I. Bivalvia.

*Proc. U. S. Nat. Mus.*, vol. 20, pp. 775-901.

Based largely on *Albatross* dredgings. The following described as new: *Kelli-*

189.

## 1898. VERRILL, ADDISON E., and KATHARINE J. BUSH—Continued.

*opsis*, *Axinulus*, *Axinodon*, *Leptaxinus*, *Martesia fragilis*, *Abra longicallis americana*, *Montacuta bidentata tenuis*, *M. striatula*, *M. casta*, *M. cuneata*, *M. triquetra*, *M. bidentata fragilis*, *Cryptodon insignis*, *C. croulinensis altus*, *C. equalis*, *C. planus*, *C. obsoletus*, *C. brevis*, *C. inequalis*, *C. simplex*, *C. pygmaeus*, *C. ova-tus*, *Axinopsis cordata*, *A. orbiculata inequalis*, *Axinodon ellipticus*, *Leptaxinus minutus*, *Cuspidaria turgida*, *C. media*, *C. parva*, *C. ventricosa*, *C. formosa*, *C. fraterna*, *Cardiomya abyssicola*, *C. gemma*, *Halonympha striatella*, *Myonera pretiosa*, *Cetoconcha atypa*, *Lyonsiella cordata*, *Lyonsia granulifera*, *Clidophora inornata*, *Kennerlia brevis*, *Periploma affinis*, *Limatula regularis*, *L. nodulosa*, *L. hyalina*, *Bathyarca abyssorum*, *B. anomala*, *Limopsis sulcata*, *L. profundicola*, *Nucula subovata*, *Yoldia casta*, *Yoldiella iris*, *Y. subangulata*, *Y. fraterna*, *Y. curta*, *Y. pachia*, *Y. inconspicua*, *Y. lenticula ambliia*, *Y. minuscula*, *Y. dissimilis*, *Malletia abyssorum*, *M. polita*, *Tindaria lata*, *Solemya grandis*, *Ledella messanensis sublevis*.

190.

1898. MOSER, J. F., Lieut. Comdr. U. S. N. Report on the work of the steamer *Albatross* (abstract).

*Rep. U. S. F. C.* 1897, part 23, pp. CXLVII-CLXXI.

An abstract from report of commanding officer. Voyage to Pribilof, Commander, Kuril, and Robben islands, with fur-seal investigation commission, returning via Japan and Hawaiian Islands; fishery investigations off southern California; notes on results of dredge hauls; tabular records of dredging, and other operations.

191.

1898. MARK, E. L. Reports on the dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, carried on by the U. S. F. C. steamer *Albatross*, during 1891. XXIV.—Preliminary report on *Branchiocerianthus urceolus*, a new type of Actinian.

*Bull. Mus. Comp. Zool.* 1890, vol. 32, pp. 147-154, 3 pls.

192.

1898. RICHARDSON, HARRIET. Description of a new parasitic Isopod of the genus *Æga*, from the southern coast of the United States.

*Proc. Biol. Soc. Wash.* 1898, vol. 12, pp. 39-40.

*Æga ecarinata* from Albatross dredging is described as new.

193.

1899. FLINT, JAMES M. Recent Foraminifera. A descriptive catalogue of specimens dredged by the U. S. F. C. steamer *Albatross*.

*Ann. Rep. Smith. Institution* 1897; *Rep. U. S. Nat. Mus., Part I*, pp. 249-350, 80 pls.

A systematic discussion of the species, with analytical keys. Contains chapter on the structure and character of the Foraminifera. The following are described as new species: *Crithionina pisum hispida*, *Psammosphæra fusca testacea*, *Saccamina consociata*, *Reophax difflugiformis testacea*, *R. bilocularis*, *Thuramina favosa*, *T. cariosa*, *Biloculina dehiscens*, *Miliolina angularis*, *Peneroplis pertusus discoideus*, *Lagena castanea*, *Cristellaria limbata*, *Ramulina proteiformis*.

194.

1899. DALL, W. H. Synopsis of the American species of the family Diplodontidæ.

*Jour. of Conch. (Brit.)*, Oct., pp. 244-246.

*Diplodonta platensis* from Albatross collections is described as new.

195.

1899. DALL, WILLIAM H. Synopsis of the recent and Tertiary Leptoneca of North America and the West Indies.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 874-897, 2 pls.

Based in part on Albatross collections. The following species are described as new: *Sportella pilsbryi*, *S. californica*, *S. stearnsii*, *Anisodonta corbuloides*, *Erycina linella*, *E. emmonsi*, *E. periscopiana*, *E. fernandina*, *E. compressa*, *Bornia barbadensis*, *B. retifera*, *Mysella barbadensis*, *M. aleutica*, *M. pedroana*, *Montacuta floridana*, *M. minuscula*, *M. limpida*, *M. percompressa*.

196.

1899. BUSH, KATHERINE J. Revision of the marine Gastropods referred to *Cyclostrema*, *Adeorbis*, *Vitrinella*, and related genera, with descriptions of some new genera and species belonging to the Atlantic fauna of America.

*Trans. Conn. Acad. Arts and Sciences* 1899, vol. 10, pp. 97-143.

Based in part on Albatross collections. New genera and species described are as follows: *Lissospira*, *Leptogyra*, *Mölleropsis*, *Choristella*, *Cyclostremella*, *Pseudorotella minuscula*, *Vitrinella tryoni*, *Circulus dalli*, *Lissospira striata*, *L. (?) convexa*, *L. (Ganesa) abyssicola*, *L. (Ganesa?) rarinata*, *Granigyra spinulosa*, *Leptogyra verrilli*, *L. inconspicua*, *L. eritmeta*, *Mölleropsis abyssicola*, *Choristella leptalea*, *C. brychia*, *Cyclostremella humilis*.

197.

1899. LÜTKEN, C. F., and TH. MORTENSEN. Reports of an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by the steamer *Albatross*, during 1891. XXV.—The Ophiuridæ.

*Mems. Mus. Comp. Zool.* 1899, vol. 23, pp. 93-208, 22 pls., chart.

Contains a systematic account of the species, bibliography, etc. The genus *Gymnophiura* and the following species are described as new: *Ophiozona contigua*, *O. alba*, *Ophiernus seminudus*, *O. annectens*, *O. polyporus*, *Gymnophiura mollis*, *G. cœrulescens*, *Ophioglypha superba*, *O. abscisa*, *O. obtecta*, *O. tumulosa*, *O. plana*, *O. scutellata*, *O. nana*, *O. divisa*, *Ophiocten pacificum*, *Ophiomusium glabrum*, *O. diomedæ*, *O. variabile*, *Ophiactis profundus*, *Amphiura serpentina*, *A. gymnogastra*, *A. polyacantha*, *A. seminuda*, *A. brevipes*, *A. gymnopora*, *A. diomedæ*, *A. assimilis*, *A. granulata*, *A. gastracantha*, *A. notacantha*, *A. papillata*, *Ophionereis nuda*, *Ophiochiton carinatus*, *Ophiacantha pacifica*, *O. inconspicua*, *O. spinifera*, *O. moniliformis*, *O. costata*, *O. contigua*, *O. hirta*, *O. paucispina*, *Ophiomitra granifera*, *O. partita*, *O. lævis*, *Ophiothrix galapagensis*, *Ophiomyxa panamensis*, *Sigsbeia lineata*, *Asteronyx dispar*, *A. excavata*, *A. plana*, *Astroschema sublaeve*, *Gorgonocephalus diomedæ*.

198.

1899. GARMAN, S. Reports of an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by the *Albatross* during 1891. XXVI. The Fishes.

*Mems. Mus. Comp. Zool.* 1899, vol. 24, 431 pp., 97 pls., chart.

An important report with a separate volume of plates, many of which are colored. Contains a general discussion of deep-sea fishes, special discussions and descriptions, chapters on lateral canal system, distribution of genera, lists of species and stations, bibliography, etc. New genera and species described are as follows: *Centristhmus*, *Leucicorus*, *Bothrocaropsis*, *Ectreposeastes*, *Dolopichthys*, *Dibranchopsis*, *Dibranchichthys*, *Eretmichthys*, *Monomeropus*, *Pseudonius*, *Holcomycteronus*, *Sciadonus*, *Microlepidium*, *Leptophycis*, *Lychnopoles*, *Dactylostomias*, *Leptochilichthys*, *Congrosoma*, *Halieutopsis*, *Raja badia*, *Centroscyllium nigrum*, *Liopropoma longilepis*, *Centristhmus signifer*, *Pontinus furcirhinus*, *Ectreposeastes imus*, *Hoplostethus pacificus*, *Trachichthys mento*, *Caulolepis subulidens*, *Melamphaes nigrofulvus*, *M. maxillaris*, *M. frontosus*, *Trichiurus nitens*, *Teuthis elegans*, *Chiasmodon subniger*, *Lophiomus spilurus*, *L. caulinaris*, *Dolopichthys allector*, *Chaulax coloratus*, *Oncocephalus porrectus*, *Halieutopsis tumifrons*, *Dibranchus hystrix*, *D. scaber*, *D. asper*, *Dibranchichthys nudivomer*, *Malthopsis sparsa*, *M. erinacea*, *M. spinosa*, *M. spinulosa*, *Prionotus frontalis*, *Peristedium barbiger*, *P. crustosum*, *Paraliparis grandiceps*, *P. attenuatus*, *P. angustifrons*, *P. latifrons*, *Calionymus atrilabiatus*, *Entomacrodus cruentatus*, *Bothrocaropsis alalonga*, *B. rictolata*, *B. elongata*, *Gymnelis conorhynchus*, *Lycodopsis scaurus*, *Lycodes anguis*, *L. serpens*, *L. incisus*, *L. cicatrifer*, *Phucocætes suspectus*, *Maynea bulbiceps*, *Leucicorus lusciosus*, *Mixonus caudalis*, *Dicrolene filamentosa*, *D. nigra*, *D. pullata*, *Porogadus longiceps*, *P. atripectus*, *P. breviceps*, *Monomitopus torvus*, *Monomeropus malispinosus*, *Bassozetus nasus*, *Diplacanthopoma jordani*, *Holcomycteronus digitatus*, *Eretmichthyspinatus*, *E. ocella*, *Catetyx simus*, *Pseudonius acutus*, *Acanthonus spinifer*, *Sciadonus pedicellaris*, *Lamproprogrammus illustris*, *Microlepidium grandiceps*, *Leptophycis filifer*, *Merluccius angustimanus*, *Antimora rhina*, *Læmonema gracillipes*, *Physiculus longipes*, *P. rastrelliger*, *Breg-*

198.

1899. GARMAN, S.—Continued.

*maceros longipes*, *Macrurus bulbiceps*, *M. bucephalus*, *M. liraticeps*, *M. barbiger*, *M. capito*, *M. leucophæus*, *M. boops*, *M. fragilis*, *M. carminifer*, *M. convergens*, *M. orbitalis*, *M. loricatus*, *M. cuspidatus*, *M. gracillicauda*, *M. latirostratus*, *M. anguliceps*, *M. latinasutus*, *M. trichiurus*, *M. tenuicauda*, *M. canus*, *Hippoglossina vagrans*, *Citharichthys maculifer*, *Monolene maculipinna*, *M. dubiosa*, *Symphurus varius*, *S. microlepis*, *Sternoptyx obscura*, *Argyropelecus lychnus*, *A. caninus*, *A. affinis*, *Polyipnus lateratus*, *Valenciennellus stellatus*, *Maurollicus oculatus*, *M. lucetius*, *Lychnopoles argenteolus*, *Cyclothone signata*, *C. acclinidens*, *Synodus simulans*, *S. acutus*, *Chlorophthalmus mento*, *Scopelengys dispar*, *Bathypterois ventralis*, *B. pectoralis*, *Ipnotus agassizii*, *Myctophum oculo*, *M. tenuiculum*, *M. luminum*, *M. auro-laternatum*, *M. nitidulum*, *M. lateratum*, *M. atratum*, *Chauliodus barbatus*, *C. dentatus*, *Stomias colubrinus*, *S. hexagonatus*, *S. atriventer*, *Dactylostomias filifer*, *Leptochilichthys agassizi*, *Bathytroctes alvifrons*, *B. alveatus*, *B. inspector*, *Narcetes pluriserialis*, *Alepocephalus convexifrons*, *A. asperifrons*, *A. fundulus*, *Halosaurus attenuatus*, *H. radiatus*, *Notacanthus spinosus*, *Uroconger varidens*, *Conger mucrona caudalis*, *Congrosoma evermanni*, *Ophichthys frontalis*, *O. biserialis*, *Echidna cocosa*, *E. scabra*, *Xenomystax rictus*, *Chlopsis gilbertii*, *Venefica ocella*, *V. tentaculata*, *Serrivomer sector*, *Labichthys bowersii*, *Nemichthys fronto*, *Atopichthys esunculus*, *A. sicarius*, *A. cinctus*, *A. dentatus*, *A. falcidens*, *A. acus*, *A. ophichthys*, *A. cingulus*, *A. lychnus*, *A. obtusus*, *A. longidens*, *Myxine circifrons*, *M. tridentiger*, *M. acutifrons*.

199.

1899. BEAN, BARTON A. Notes on the capture of rare fishes.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 639, 640.

This paper contains a reference to the capture by the *Albatross* of a second specimen of *Caulolepis longidens*.

200.

1899. RATHBUN, MARY J. The Brachyura collected by the U. S. F. C. steamer *Albatross* on the voyage from Norfolk, Va., to San Francisco, Cal., 1887–88.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 567–616.

200.

## 1899. RATHBUN, MARY J.—Continued.

Descriptions of 4 new genera and 31 new species: *Lipæsthesius*, *Ectæsthesius*, *Ovalipes*, *Tetrias*, *Collodes tumidus*, *Anamathia cornuta*, *Hemus analogus*, *Lissa tuberosa*, *L. aurivilliusi*, *Microphrys branchialis*, *Thyrolambrus erosus*, *Actæa angusta*, *A. inornata*, *Medæus lobipes*, *Lipæsthesius leeanus*, *Pilumnus spinulifer*, *Micropanope nitida*, *M. areolata*, *Lophopanopeus maculatus*, *Ectæsthesius bifrons*, *Portunus angustus*, *P. minimus*, *Acanthocyclus hassleri*, *Palicus lucasii*, *Eucratopsis macrophthalma*, *Chasmocarcinus latipes*, *Pinnixa brevipollex*, *P. affinis*, *Tetrias scabripes*, *Callappa saussurei*, *Hepatus lineatus*, *Oschila levis*, *Ebalia cristata*, *Randallia bulligera*, *R. agaricias*.

201.

## 1899. STEJNEGER, LEONHARD. Birds of the Kuril Islands.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 269-296.

A part of the material upon which this paper is based was collected during the writer's voyage among the Kurils on the steamship *Albatross*; *Cephus snowi* is described as new.

202.

## 1899. RICHARDSON, HARRIET. Key to the Isopods of the Pacific coast of North America, with descriptions of 22 new species.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 815-869.

Based in part on *Albatross* collections. New genera and species: *Colidotea*, *Eusymmerus*, *Tanais alascensis*, *Cirolana linguifrons*, *Eurydice caudata*, *Coralana truncata*, *Anilocra occidentalis*, *Dynamene dilatata*, *D. tuberculosa*, *D. benedicti*, *D. glabra*, *Sphæroma rhomburum*, *S. octoneum*, *Tecticeps convexus*, *Cilicæa cordata*, *C. caudata gilliana*, *C. granulosa*, *Cleantis occidentalis*, *C. heathii*, *Eusymmerus antennatus*, *Arcaturus intermedius*, *Ianthe triangulata*, *I. erostrata*, *Jæropsis lobata*.

203.

## 1899. LINNELL, MARTIN E. On the Coleopterous insects of Galapagos Islands.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 249-268.

Based largely on *Albatross* collections. The genus *Pseudoryctes* and the following species described as new: *Calo-*

203.

## 1899. LINNELL, MARTIN E.—Cont'd.

*soma howardi*, *Scarites galapagoensis*, *Distichus smithi*, *Amphicerus frontalis*, *Achryson galapagoensis*, *Eburia lanigera*, *E. bauri*, *Acanthoderes galapagoensis*, *Stomion carinipenne*, *S. piceum*, *S. bauri*, *Ammophorus caroli*, *Pedonoeces bauri*, *Lobopoda galapagoensis*, *Oracis galapagoensis*, *Pantomorus galapagoensis*.

204.

1899. GILBERT, CHARLES H. Report on fishes obtained by the steamer *Albatross* in the vicinity of Santa Catalina Island and Monterey Bay.

*Rep. U. S. F. C. 1898*, part 24, pp. 25-29, 2 pls.

Collections from shore and dredging stations; the following species described as new: *Radulinus boleoides*, *Averrun-cus sterletus*.

205.

1899. GILBERT, CHARLES HENRY. On the occurrence of *Caulolepis longidens* Gill, on the coast of California.

*Proc. U. S. Nat. Mus.*, vol. 21, pp. 565, 566.

The species was originally taken by the *Albatross* off the coast of New Jersey.

206.

1899. WOODWORTH, W. McM. Reports on the dredging operations off the west coast of Central America, to the Galapagos, to west coast of Mexico, and in the Gulf of California, carried on by the steamer *Albatross* during 1891. XXVII. Preliminary account of Planktonemertes agassizii, a new pelagic Nemertean.

*Bull. Mus. Comp. Zool. 1899*, vol. 35, pp. 1-4, 1 pl.

207.

1899. MOSER, Commander JEFFERSON F. The salmon and salmon fisheries of Alaska. Report of the operations of the *Albatross* for the year ending June 30, 1898.

*Bull. U. S. F. C. 1898*, part 18, pp. 1-178, 63 pls., 26 figs., cht.

An investigation of the condition and needs of the Alaskan salmon fishery;

207.

1899. MOSER, Commander JEFFERSON F.—Continued.

contains chapters on the salmon of Alaska, fishery and cannery methods, depletion of streams, statistics of salmon industry, etc.

208.

1899. SMITH, HUGH M. Exploring expedition to the mid-Pacific Ocean.

*Science (U. S.)*, June 9, pp. 796-798.

An outline of the proposed voyage of the steamship *Albatross* under direction of Alexander Agassiz, with a list of officers.

209.

1899. SMITH, HUGH M. The deep-sea exploring expedition of the steamer *Albatross*.

*Nat. Geog. Mag.*, vol. 10, No. 8, pp. 290-296, 3 ill.

An outline of the proposed voyage to the tropical Pacific under the direction of Alexander Agassiz.

210.

1899. VERRILL, A. E. Descriptions of imperfectly known and new Actinians, with critical notes on other species, III. [Brief Contributions to Zoology from the Museum of Yale College, No. LX.]

*Am. Jour. Sci.*, fourth series, vol. 7, 1899, pp. 143-146, 20 figs.

*Raphactis nitida*, from *Albatross* dredgings, is described as new genus and species.

211.

1899. VERRILL, A. E. Revision of certain genera and species of starfishes, with descriptions of new forms.

*Trans. Conn. Acad. Arts and Sciences* 1899, vol. 10, pp. 145-234, 8 pls.

Based in part on *Albatross* collections. The new genera and species described are as follows: *Pyrenaster*, *Peltaster*, *Litonotaster*, *Eugoniaster*, *Antheniaster*, *Cladaster*, *Acodonaster*, *Prionaster*, *Sideriaster*, *Tosia* (*Plinthaster*) *compta*, *T. (Plinthaster) nitida*, *Peltaster hebes*, *Hippasteria caribæa*, *Cladaster rudis*, *Mediaster agassizii*, *Pseudarchaster* (?) *hispidus*, *P. granuliferus*, *P. ordinatus*, *Odontaster setosus*, *O. robustus*, *Prionaster elegans*, *Sideriaster grandis*, *Margiaster austerus*.

212.

1899. VERRILL, A. E. North American Ophiuroidea. I. Revision of certain families and genera of West Indian Ophiurans. II. A faunal catalogue of the known species of West Indian Ophiurans.

*Trans. Conn. Acad. Arts and Sciences* 1899, vol. 10, pp. 301-386, 2 pls.

Based in part on *Albatross* collections. New genera and species: *Amphioplus*, *Ophiochondrella*, *Ophiobyrseella*, *Astrogeron*, *Amphiocnida*, *Astrocladus*, *Amphioplus agassizii*, *Ophiacantha* (*Ophiecotodia*) *pectinula*, *Ophioscolex fragilis*.

212a.

- 1899-1900. AGASSIZ, A. Explorations of the *Albatross* in the Pacific Ocean. Letters to U. S. Commissioner of Fisheries.

*Science*, Dec., 1899; Jan. and April, 1900.

Preliminary reports submitted during the voyage. See No. 213.

213.

1900. AGASSIZ, A. Explorations of the *Albatross* in the Pacific Ocean. [Extract from a letter to Hon. George M. Bowers, U. S. Commissioner of Fish and Fisheries, dated Papeete Harbor, Tahiti Island, Sept. 30, 1899, on the trip of the *Albatross* from San Francisco to Papeete.]

*Am. Jour. Sci.* 1900, fourth series, vol. 9, No. 49, Jan., pp. 33-43.

- The same. II. The Paumotus. [Letter No. 2, dated Papeete Harbor, Nov. 6, 1899, etc.]

*Am. Jour. Sci.* 1900, fourth series, vol. 9, No. 50, Feb., pp. 109-116.

- The same. III. [Letter No. 3, dated Suva Harbor, Fiji Islands, Dec. 11, 1899, etc.]

*Am. Jour. Sci.*, fourth series, vol. 9, No. 51, Mar., 1900, pp. 193-198.

- The same. IV. [Letter No. 4, Yokohama, Japan, Mar. 5, 1900, etc.]

*Am. Jour. Sci.*, fourth series, vol. 9, No. 53, May, 1900, pp. 369-374.

Preliminary reports submitted during the voyage. The same series was



213.

## 1900. AGASSIZ, A.—Continued.

published in *Science* (U. S.) for Dec., 1899, Jan., and April, 1900. Letter No. 3 describes successful haul of the dredge 75 miles to the eastward of Tongatabu, in 4,173 fathoms, the deepest haul ever made. The net contained silicious sponges and brown volcanic mud, with radiolarians. Letter No. 4 records the deepest sounding of the *Albatross*, near Guam, in 4,813 fathoms.

214.

1900. MOORE, H. F. *The Albatross South Sea Expedition.*

*Rep. U. S. F. C.* 1900, part 26, pp. 137-161.

An account of the expedition, in charge of Alexander Agassiz, for deep-sea investigations and the study of coral reefs. Sketch of the voyage from San Francisco, Cal., to Yokohama, Japan, via the Marquesas, Paumotu, Society, Cook, Tonga, Fiji, Gilbert, Marshall, Caroline, and Ladrone islands.

215.

1900. BAKER, RAY STANNARD. *The Bottom of the Sea.*

*McClure's Mag.*, Dec., pp. 160-170, 8 cuts.

An authorized account of the researches of Sir John Murray, in the *Science of Oceanography*. Contains references to the work of the *Albatross* in the Pacific Ocean.

216.

1900. DALL, WILLIAM H. *Synopsis of the Solenidae of North America and the Antilles.*

*Proc. U. S. Nat. Mus.*, vol. 22, pp. 107, 112.

Based in part on *Albatross* collections. New species here described: *Solen mexicanus*, *Ensis californicus*, *Tagelus poeyi*.

217.

1900. RATHBUN, MARY J. *Synopsis of North American Invertebrates. VII. The cyclometopous or can-croid crabs of North America.*

*Am. Nat.*, vol. 34, Feb., pp. 131-143.

Based in part on *Albatross* collections. Contains analytical keys and bibliography.

218.

1900. NUTTING, CHARLES CLEVELAND. *American Hydroids. Part I. The Plumularidae.*

*U. S. Nat. Mus. Special Bulletin*, 235 pp., 34 pls.

Contains morphology of the Plumularidae; systematic discussion; bibliography. Based largely on the dredgings of the *Albatross*. New genera and species described are as follows: *Monothea*, *Calvinia*, *Thecocarpus*, *Nuditheca*, *Plumularia altitheca*, *P. floridana*, *P. alternata*, *P. inermis*, *P. goodei*, *P. corrugata*, *P. palmeri*, *P. virginiae*, *P. profunda*, *P. dendritica*, *P. paucinoda*, *Antennularia americana*, *A. rugosa*, *A. geniculata*, *A. pinnata*, *Monothea margaretta*, *Antennopsis distans*, *A. longicornia*, *A. nigra*, *Schizotricha dichotoma*, *S. parvula*, *Diplopteron quadricorne*, *D. grande*, *D. longipinna*, *Polyplumularia armata*, *Aglaophenia floweri*, *A. elegans*, *A. aperta*, *A. cristifrons*, *A. contorta*, *A. mammillata*, *A. minima*, *A. rathbuni*, *A. latirostris*, *A. octocarpa*, *A. bicornuta*, *Calvinia mirabilis*, *Thecocarpus normani*, *T. benedicti*, *Cladocarpus obliquus*, *C. septatus*, *C. flexuosus*, *C. grandis*, *C. carinatus*, *Aglaophenopsis distans*, *A. verrilli*, *Lytocarpus clarkei*, *L. curtus*, *L. furcatus*, *Halicornaria longicauda*, *H. variabilis*.

219.

1900. STEJNEGER, LEONHARD. *Reports on dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the Albatross, during 1891. XXVIII. Description of two new lizards of the genus Anolis, from Cocos and Malpelo islands.*

*Bull. Mus. Comp. Zool.* 1900, vol. 36, pp. 161-164, 1 plate.

*Anolis agassizi* from Malpelo and *A. townsendi* from Cocos are described as new species.

220.

1901. BENEDICT, JAMES E. *The hermit crabs of the Pagurus bernhardus type.*

*Proc. U. S. Nat. Mus.* vol. 23, pp. 451-466.

Based in part on *Albatross* collections.



221.

1901. DALL, WILLIAM H. Synopsis of the family Tellinidæ and of the North American species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 235-326.

Based in part on *Albatross* collections. New species described: *Tellina georgiana*, *T. iheringi*, *T. americana*, *T. promera*, *T. flagellum*, *T. colorata*, *T. texana*, *T. reclusa*, *T. pacifica*, *T. pristiphora*, *T. leucogonia*, *T. meropsis*, *T. amianta*, *T. paziana*, *T. macneilii*, *T. suffusa*, *T. cerrosiana*, *T. panamensis*, *T. recurva*, *T. santarosæ*, *Macoma phenax*, *M. extenuata*, *M. tageliformis*, *M. krausei*, *M. sitkana*, *M. alaskana*, *M. panamensis*.

222.

1901. DALL, WILLIAM H. Synopsis of the family Cardiidæ and of the North American species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 381-392.

Based in part on *Albatross* collections.

223.

1901. RICHARDSON, HARRIET. Key to the Isopods of the Atlantic coast of North America, with descriptions of new and little-known species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 493-579.

Based in part on *Albatross* collections. The genus *Synurops* and the following species described as new: *Calathura crenulata*, *Cirolana obtruncata*, *C. albidia*, *Corallana sexticornis*, *Ægathoa linguifrons*, *Sphæroma yucatanum*, *Dynamene angulata*, *Cilicæa linguicauda*, *Erichsonella floridana*, *Arcturus caribæus*, *Eurycope caribbea*, *Synurops granulatus*, *Philoscia richmondi*, *Sphæroniscus portoricensis*.

224.

1901. JORDAN, DAVID STARR, and JOHN OTTERBEIN SNYDER. A list of fishes collected in Japan by Keinosuke Otaki and by the U. S. F. C. steamer *Albatross*, with descriptions of 14 new species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 335-380, 12 pls.

The following genera and species are described as new: *Ishikauia*, *Otakia*, *Konosirus*, *Bryttosus*, *Eteliscus*, *Trifissus*, *Rhombiscus*, *Kareius*, *Usinosita*, *Zebrias*, *Areliscus*, *Insidiator*, *Chimæra*

224.

1901. JORDAN, DAVID STARR, and JOHN OTTERBEIN SNYDER—Cont'd.

*phantasma*, *Gobio biwæ*, *G. mayedæ*, *Otakia rasborina*, *Congrellus meeki*, *Pseudotolithus mitsukurii*, *Sebastodes hakodatis*, *S. scythropus*, *Scorpæna onaria*, *Calionymus beniteguri*, *Trifissus ioturus*, *Blennius yatebei*, *Cælorhynchus kishinouyei*, *Verasper otakii*.

225.

1901. Cruise of the U. S. F. C. steamer *Albatross* in the Tropical Pacific, August 1899–March 1900, and list of the stations occupied.

Printed by Mus. Comp. Zool., 1901, pp. 45-64.

Abstract from log of steamer *Albatross*. The first part gives daily positions of the ship; the second, positions of stations with temperature observations, depth, nature of bottom, etc. Total distance run, San Francisco to Yokohama, 15,122 miles.

226.

1901. JORDAN, DAVID STARR, and JOHN OTTERBEIN SNYDER. A review of the lancelets, hag-fishes, and lampreys of Japan, with a description of two new species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 725-734, 1 pl.

Based in part on *Albatross* collections. *Branchiostoma nakagawæ* and *Myxine garmani* described as new.

227.

1901. BENEDICT, JAMES E. Four new symmetrical hermit crabs (Pagurids) from the West India region.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 771-776.

Based on *Albatross* dredgings. Species described: *Cancellus ornatus*, *C. spongicola*, *Pylocheles partitus*, *Mixtopagurus gilli*.

228.

1901. RIDGWAY, ROBERT. The birds of North and Middle America. Part I. Fringillidæ.

*Bull. U. S. Nat. Mus.* No. 50, 1901, pp. xxxi, 715, 20 pls.

Contains descriptions of all North American Fringillidæ from *Albatross* collections, including those of the Galapagos and West Indian islands.

228a.

1901. DALL, WILLIAM HEALEY. Synopsis of the Lucinacea and of the American species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 779-833, 4 pls.

Based in part on *Albatross* collections. The following species, chiefly from *Albatross* and *Fish Hawk* dredgings, described as new: *Thyasira excavata*, *T. tomeana*, *T. magellanica*, *Axinopsis viridis*, *Diplodonta aleutica*, *Codakia colpoica*, *C. cubana*, *C. portoricana*, *C. mexicana*, *C. galapagana*, *C. chiquita*, *Phacoides bermudensis*, *P. crenella*, *P. amiantus*, *P. lamprus*, *P. heroicus*, *P. approximatus*.

229.

1901. COCKERELL, T. D. A. On a slug of the genus *Veronicella* from Tahiti.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 835-836.

*Veronicella agassizi* from *Albatross* collections described as new, with list of recently described Pacific species.

229a.

1901. JORDAN, DAVID STARR, and JOHN OTTERBEIN SNYDER. A review of the apodal fishes or eels of Japan, with descriptions of 19 new species.

*Proc. U. S. Nat. Mus.*, vol. 23, pp. 837-890, 22 figs.

Based in part on *Albatross* collections. New genera: *Xyrias*, *Æmasia*. New species: *Synaphobranchus iraconis*, *S. jenkinsi*, *Leptocephalus erebennus*, *L. kiuisuanus*, *L. riukiuanus*, *L. mystromi*, *L. retrotinctus*, *Chlopsis fierasfer*, *Muraenichthys owstoni*, *M. hattæ*, *M. aoki*, *Sphagebranchus moseri*, *Pisoodonophis zophistius*, *Xyrias revulsus*, *Microdonophis erabo*, *Ophichthus asakusæ*, *O. tsuchidæ*, *Æmasia lichenosa*, *Echidna kishinouyei*, *Uropterygius okinawæ*.

229b.

1901. STEJNEGER, LEONHARD. Diagnosis of a new species of Iguanoid lizard from Green Cay, Bahama Islands.

*Proc. U. S. Nat. Mus.*, vol. 23, p. 471.

*Leioccephalus virescens* from *Albatross* collections described as new.

[NOTE.—The preceding are all American publications. The few titles of European publications which follow either relate directly to the work of the *Albatross* or are of special interest in this connection.]

230.

- GILL, THEODORE, and JOHN A. RYDER. Note on *Eurypharynx* and an allied new genus.

*Zool. Anz.* 1884, 7, pp. 119-123.

Based on *Albatross* dredgings. Comments on the relationships and characters of *Gastrostomus* and *Eurypharynx*.

231.

- GILL, THEODORE. What are the Saccopharyngoid fishes?

*Nature*, 1884, vol. 29, Jan. 10, p. 236.

Based on *Albatross* dredgings. A discussion of the relationships and characters of the *Lyomeri*.

232.

- SCHULZE, FRZ. EILHARD. Amerikanische Hexactinelliden nach dem Materiale der *Albatross-Expedition*. Herausgegeben mit Unterstützung d. kgl. preuss. Akademie der Wissenschaften, 1899. Jena, Gust. Fischer. 4°, 126 pp. Atlas von 19 Taf.

The following genera and species are described as new: *Calycosoma*, *Calycosaccus*, *Aphorme*, *Acanthosaccus*, *Claviscopulia*, *Bathyxiphus*, *Hyalonema schmidtii*, *H. hercules*, *H. populiferum*, *H. ovuliferum*, *Holascus undulatus*, *Calycosoma validum*, *Calycosaccus ijimai*, *Caulophacus agassizii*, *Aphorme horrida*, *Bathydorus uncifer*, *Acanthascus plutei*, *Staurocalyptus solidus*, *S. fasciculatus*, *Rhabdocalyptus tener*, *R. nodulosus*, *R. asper*, *R. mirabilis*, *Acanthosaccus tenuis*, *Farrea aculeata*, *F. convolvulus*, *Eurete erectum*, *claviscopulia intermedia*, *Chonelasma tenerum*, *Bathyxiphus subtilis*.

233.

- MURRAY, Sir JOHN. Address to the geographical section of the British association.

*Scottish Geog. Mag.*, 1899, vol. 15, Oct., pp. 505-522, map.

An important summary of the state of oceanographic science. Contains a reference to the investigations of the *Albatross* in the Pacific Ocean.

## PAPERS IN PREPARATION RELATING TO WORK OF THE ALBATROSS.

In preparation for the Bulletin of the U. S. Fish Commission:

Alaska Salmon Investigations in 1900. Commander J. F. Moser.

Alaska Salmon Investigations in 1901. Commander J. F. Moser.

Report on the cruise of the U. S. Fish Commission steamer *Albatross*, in the South Seas, 1899-1900. Commander J. F. Moser.

The following are in preparation for publication by the Museum of Comparative Zoology, Cambridge:

Reports on the Results of the Expedition of 1891 of the U. S. F. C. steamer *Albatross*, Lieut. Commander Z. L. Tanner, U. S. N., commanding, in charge of Alexander Agassiz:

Pelagic Fauna. A. Agassiz.

Echini. A. Agassiz.

Panamic Deep-Sea Fauna. A. Agassiz.

Sagittæ. K. Brandt.

Thalassicolæ. K. Brandt.

Siphonophores. C. Chun.

Eyes of Deep-Sea Crustacea. C. Chun.

Mollusks. W. H. Dall.

Cirripeds. H. J. Hansen.

Ascidians. W. A. Herdman.

Antipathids. S. J. Hickson.

Cephalopods. W. E. Hoyle.

Deep-Sea Corals. G. von Koch.

Solenogaster. C. A. Kofoid.

Phosphorescent Organs of Fishes. R. von Lendenfeld.

Branchiocerianthus. E. L. Mark.

Bottom Specimens. John Murray.

Alcoholic Birds. Robert Ridgway.

Pteropods and Heteropods. P. Schiemenz.

Starfishes. H. Ludwig.

Alcyonarians. Theo. Studer.

Salpidæ and Doliolidæ. M. P. A. Trautstedt.

Halobatidæ. E. P. Van Duzee.

Sipunculids. H. B. Ward.

Sponges. H. V. Wilson.

Nemerteans and Annelids. W. McM. Woodworth.

Reports on the Scientific Results of the Expedition to the Tropical Pacific, in charge of Alexander Agassiz, on the U. S. F. C. steamer *Albatross*, from August, 1899, to March, 1900, Commander Jefferson F. Moser, U. S. N., commanding:

General Report of the Expedition. A. Agassiz.

Coral Reefs of the Tropical Pacific. A. Agassiz.

Echini. A. Agassiz.

Acalephs. A. Agassiz and A. G. Mayer.

Earthworms. F. E. Beddard.

Mollus. s. W. H. Dall.

Volcanic Rocks. Reginald A. Daly.

Sharks' Teeth from the Red Clay. C. R. Eastman.

Coralliferous Limestones.

Crustacea. Walter Faxon.

Foraminifera and Radiolaria. James M. Flint.

Insects. S. Henshaw and A. G. Mayer.

Cephalopods. W. E. Hoyle.

Copepods. A. Kramer.

Starfishes and Ophiurans. H. Ludwig.

Genus Partula. A. G. Mayer.

Holothurians. K. Mitsukuri.

Pelagic Crustacea. H. F. Moore.

Ostracods. G. W. Müller.

Bottom Specimens. Sir John Murray.

Hydrocorallidæ. R. Rathbun.

Ascidians. W. E. Ritter.

Siliceous Sponges. F. E. Schulze.

Reptiles. L. Stejneger.

Mammals, Birds, and Fishes. C. H. Townsend.

Corals Recent, and Fossil. T. W. Vaughan.

Nullipores and Corallines. Mrs. Max Weber.

Annelids. W. McM. Woodworth.

In preparation for the Bulletin and the Report of the U. S. National Museum:

A review of the Gobiidæ of Japan. D. S. Jordan and J. O. Snyder.

Aboriginal American Harpoons. O. T. Mason.

Aboriginal American Basketry. O. T. Mason.

LIST OF PUBLICATIONS SHOWING THE TITLES OF ALBATROSS PAPERS  
CONTAINED IN EACH.

NOTE.—The numbers at ends of references are those of the chronological list.

*In the Reports of the United States Commission of Fish and Fisheries:*

- Report on work of the U. S. F. C. steamer *Fish Hawk* for the year ending Dec. 31, 1882, and on the construction of the steamer *Albatross*. Tanner. 4.
- Report on the construction and outfit of the *Albatross*. Tanner. 13.
- Report on the work of the *Albatross*, 1883. Tanner. 14.
- Report on the work of the *Albatross*, 1884. Tanner. 35.
- Report on the work of the *Albatross*, 1885. Tanner. 45.
- Report on the work of the *Albatross*, 1886. Tanner. 52.
- Report on the work of the *Albatross*, 1887, 1888. Tanner. 70.
- Report upon the investigations of the *Albatross*, 1889. Tanner. 87.
- Report upon the investigations of the *Albatross*, 1889-1891. Tanner. 99.
- Report upon the investigations of the *Albatross*, 1892. Tanner. 111.
- Report on the work of the *Albatross*, 1893. Tanner. 132.
- Report upon the operations of the *Albatross*, 1894. Tanner and Drake. 159.
- Report upon the investigations of the *Albatross*, 1895. Drake. 160.
- Records of observations made on board the *Albatross*, 1896. Drake. 185.
- Report on the work of the *Albatross*, 1897. (Abstract.) Moser. 190.
- The *Albatross* South Sea expedition. Moore. 214.
- Ichthyological collections of the *Albatross*, 1890-1891. Gilbert. 141.
- Report on the fishes obtained by the *Albatross* in the vicinity of Santa Catalina Island and Monterey Bay. Gilbert. 204.
- Report on the Decapod Crustacea of the *Albatross* dredgings off the east coast of the United States in 1883. Smith (S. I.). 10.
- Report on the Decapod Crustacea of the *Albatross* dredgings off east coast of United States during summer and autumn of 1884. Smith (S. I.). 47.
- Lists of dredging stations of the U. S. Fish Commission, U. S. Coast Survey, and the British steamer *Challenger*, in North American waters, from 1867 to 1887, with those of the principal European government expeditions in the Atlantic and Arctic oceans. Smith (Sanderson). 58.
- Report on the medusæ collected by the *Albatross* in the region of the Gulf Stream in 1883-84. Fewkes. 30.
- Report on the medusæ collected by the *Albatross* in the region of the Gulf Stream in 1885-86. Fewkes. 55.
- Report on the discovery and investigation of fishing grounds made by the *Albatross* during a cruise along the Atlantic coast and in the Gulf of Mexico, with notes on the Gulf fisheries. Collins. 44.
- Results of the explorations made by the *Albatross* off the northern coast of the United States in 1883. Verrill. 16.
- Closing tow net for submarine use at all depths. Townsend. 165.

*In the Bulletins of the U. S. Fish Commission:*

- The fishing grounds of Bristol Bay, Alaska. Tanner. 71.
- On the appliances for collecting pelagic organisms. Tanner. 133.
- Deep-sea exploration. Tanner. 169.
- Fishing-grounds of Alaska, Washington Territory, and Oregon. Tanner. 59.
- Report of the movements and operations of the *Albatross* from September 15 to 20, 1887. Tanner. 53.
- Record of hydrographic soundings and dredging stations. Tanner. 46.
- The salmon and salmon fisheries of Alaska. Moser. 207.
- Report on the salmon fisheries of Alaska. McDonald. 126.
- A summary of the fishery investigations. Rathbun. 117.
- Notes on fishes collected at Cozumel, Yucatan. Bean. 60.
- Notes upon octopus, flying-fish, etc. Nye. 25.
- Notes taken during cruise of the *Albatross* to Grand Banks. Nye. 24.
- Hydrographic work of the *Albatross* in 1884. Schroeder. 15.
- Report on the working of the boilers and engine of the *Albatross*. Baird. 9.
- Annual report on the electric lighting of the *Albatross*. Baird. 8.
- Report upon the pearl fishery of the Gulf of California. Townsend. 84.
- Investigation of fishing banks. Collins. 48.

*In the Proceedings of the U. S. National Museum:*

- Scientific results of explorations by the U. S. F. C. steamer *Albatross*:
- I. Birds collected in Galapagos Islands in 1888. Ridgway. 57.
  - II. Birds collected on the island of Santa Lucia, West Indies, Abrolhos Islands, Brazil, and at the Straits of Magellan in 1887-88. Ridgway. 56.

*In the Proceedings of the U. S. National Museum—Continued.*Scientific results of explorations by the U. S. F. C. steamer *Albatross*—Cont'd.

- III. Batrachians and reptiles collected in 1887-88. Cope. 62.
- IV. Descriptions of new species of fishes collected at the Galapagos Islands and along the coast of the United States of Colombia, 1887-88. Jordan & Boliman. 66.
- V. Annotated catalogue of insects collected in 1887-88. Howard. 67.
- VI. List of the plants collected in Alaska in 1888. Vasey. 69.
- VII. Preliminary report on the collection of Mollusca and Brachiopoda obtained in 1887-88. Dall. 63.
- VIII. Description of a new Cottoid fish from British Columbia. Bean. 61.
- IX. Catalogue of fishes collected at Port Castries, St. Lucia, by the *Albatross*, November, 1888. Jordan. 65.
- X. On certain Mesozoic fossils from the islands of St. Paul and St. Peter in the Straits of Magellan. White. 79.
- XI. New fishes collected off the coast of Alaska and the adjacent region southward. Bean. 75.
- XII. A preliminary report on fishes collected by the *Albatross* on the Pacific coast of North America during 1889. Gilbert. 72.
- XIII. Catalogue of skeletons of birds collected at Abrolhos Islands, Brazil, the Straits of Magellan, and the Galapagos Islands, in 1887-88. Lucas. 78.
- XIV. Birds from the coasts of western North America and adjacent islands, collected in 1888-89. Townsend. 82.
- XV. Reptiles from Clarion and Socorro islands and the Gulf of California. Townsend. 83.
- XVI. Plants collected in 1889 at Socorro and Clarion islands, Pacific Ocean. Vasey. 77.
- XVII. Descriptions of new West American land, fresh-water, and marine shells. Stearns. 68.
- XVIII. List of fishes obtained in the harbor of Bahia, Brazil, and in adjacent waters. Jordan. 76.
- XIX. A supplementary list of fishes collected at the Galapagos Islands and Panama. Gilbert. 73.
- XX. On some new or interesting west American shells obtained from the dredgings of the *Albatross* in 1888. Dall. 95.
- XXI. Apodal fishes from the tropical Pacific. Gilbert. 92.
- XXII. Descriptions of 34 new species of fishes collected in 1888 and 1889, principally among the Santa Barbara Islands and in the Gulf of California. Gilbert. 93.
- XXIII. Report on the Actiniæ collected by the *Albatross* during the winter of 1887-88. McMurrich. 120.
- XXIV. Descriptions of new genera and species of crabs from the west coast of North America and the Sandwich Islands. Rathbun (M. J.). 118.
- XXV. The Mollusk fauna of the Galapagos Islands. Stearns. 115.
- XXVI. Report on the Pteropods and Heteropods collected by the *Albatross* during the voyage from Norfolk, Va., to San Francisco, Cal., 1887-88. Peck. 114.
- XXVII. Catalogue of a collection of birds made in Alaska by Mr. C. H. Townsend during the cruise of the *Albatross* in 1888. Ridgway. 112.
- XXVIII. On Cetomimidæ and Rondeletiidae, two new families of Bathybial fishes. Goode & Bean. 136.
- XXIX. A revision of the order Heteromi, deep-sea fishes. Goode & Bean. 137.
- XXX. On Harriotta, a new type of Chimæroid fish. Goode & Bean. 138.
- XXXI. Descriptions of new genera and species of crabs of the family Lithodidæ. Benedict. 146.
- XXXII. Report on the Crustacea of the order Stomatopoda collected by the *Albatross* between 1885 and 1891. Bigelow. 147.
- XXXIII. Descriptions of two new flounders, *Gastropsetta frontalis* and *Cyclopsetta chittendeni*. Bean. 135.
- XXXIV. Report on Mollusca and Brachiopoda dredged in deep water, chiefly near the Hawaiian Islands. Dall. 142.
- Diagnoses of new genera and species of deep-sea fish-like vertebrates. Gill. 1.
- Diagnoses of new genera of Nemichthyoid eels. Gill & Ryder. 2.
- On the literature and systematic relations of the Saccopharyngoid fishes. Gill & Ryder. 7.



*In the Proceedings of the U. S. National Museum—Continued.*

- On some new or little-known Decapod Crustacea from recent Fish Commission dredgings off the east coast of the United States. Smith (S. I.). 20.
- On a collection of birds made by Messrs. J. E. Benedict and W. Nye, of the steamer *Albatross*. Ridgway. 21.
- Description of a new species of *Plectromus* (*P. crassiceps*) taken by the U. S. Fish Commission. Bean. 26.
- Description of *Leptophidium cervinum* and *L. marmoratum*, new fishes from deep water off the Atlantic and Gulf coasts. Goode. 27.
- Descriptions of new fishes obtained by the U. S. Fish Commission, mainly from deep water off the Atlantic and Gulf coasts. Goode. 28.
- On a collection of *Medusæ* made by the *Albatross* in the Caribbean Sea and Gulf of Mexico. Fewkes. 31.
- Report upon the *Echini* collected by the *Albatross* in the Caribbean Sea and Gulf of Mexico, January to May, 1884. Rathbun (R.). 32.
- Notice of a collection of Stalked Crinoids made by the *Albatross* in the Gulf of Mexico and Caribbean Sea, 1884 and 1885. Rathbun, (R.). 33.
- Report upon the *Echini* collected by the *Albatross* in the Gulf of Mexico from January to March, 1885. Rathbun (R.). 34.
- Description of a new hawk from Cozumel. Ridgway. 36.
- Catalogue of a collection of birds made on the island of Cozumel, Yucatan, by the naturalists of the *Albatross*. Ridgway. 37.
- On some genera and species of *Penæidæ*, mostly from recent dredgings of the U. S. Fish Commission. Smith (S. I.). 39.
- A new Crustacean allied to *Homarus* and *Nephrops*. Smith (S. I.). 40.
- Notice of recent additions to the marine invertebrata of the northeastern coast of America, with descriptions of new genera and species and critical remarks on others. Verrill. 41.
- Descriptions of ten species and one new genus of *Annelids* from the dredgings of the *Albatross*. Benedict. 43.
- List of the *Batrachia* and *Reptilia* of the Bahama Islands. Cope. 49.
- De cription of a new form of *Spindalis* from the Bahamas. Ridgway. 51.
- The genus *Panopeus*. Benedict & Rathbun (M. J.). 80.
- Corystoid crabs of the genera *Telmessus* and *Erimacrus*. Benedict. 101.
- Preliminary descriptions of 37 new species of hermit crabs of the genus *Eupagurus*. Benedict. 101.
- Description of a new species of star-gazer (*Cathetostoma albigutta*) from the Gulf of Mexico. Bean. 105.
- Catalogue of the crabs of the family *Periceridæ* in the U. S. National Museum. Rathbun (M. J.). 106.
- A new storm petrel from the coast of western Mexico. Ridgway. 113.
- The shells of the *Tres Maras* and other localities along the shores of Lower California and the Gulf of California. Stearns. 116.
- Catalogue of the crabs of the family *Maiidæ* in the U. S. National Museum. Rathbun (M. J.). 119.
- List of *Diatomaceæ* from a deep-sea dredging in the Atlantic Ocean off Delaware Bay by the *Albatross*. Mann. 127.
- A revision of the fishes of the subfamily *Sebastinæ* of the Pacific coast of America. Eigenmann & Beeson. 128.
- A review of the fossil flora of Alaska, with descriptions of new species. Knowlton. 129.
- Descriptions of a new genus and four new species of crabs from the Antillean region. Rathbun (M. J.). 153.
- Notes on the crabs of the family *Inachidæ* in the U. S. National Museum. Rathbun (M. J.). 154.
- The genus *Callinectes*. Rathbun (M. J.). 155.
- Descriptions of new species of starfishes and ophiurans, with a revision of certain species formerly described, mostly from the collections made by the U. S. Fish Commission. Verrill. 156.
- Diagnoses of new species of Mollusks from west coast of America. Dall. 166.
- Report on fishes dredged in deep water near Hawaiian Islands. Gilbert. 170.
- Descriptions of 22 new species of fishes collected by *Albatross*. Gilbert. 171.
- Birds of the Galapagos Archipelago. Ridgway. 178.
- Revision of the deep-water Mollusca of the Atlantic coast of North America. Verrill. 189.
- Synopsis of the Recent and Tertiary Leptonacea of North America and the West Indies. Dall. 195.
- Notes on the capture of rare fishes. Bean. 199.
- The *Brachyura* collected by the *Albatross* on the voyage from Norfolk, Va., to San Francisco, Cal., 1887-88. Rathbun (M. J.). 200.



*In the Proceedings of the U. S. National Museum—Continued.*

- The birds of the Kuril Islands. Stejneger. 201.  
 Key to the Isopods of the Pacific coast of North America. Richardson. 202.  
 On the Coleopterous insects of Galapagos Islands. Linnell. 203.  
 On the occurrence of *Caulolepis longidens* Gill on the coast of California. Gilbert. 205.  
 Synopsis of the Solenidæ of North America and the Antilles. Dall. 216.  
 The hermit crabs of the *Pagurus bernhardus* type. Benedict. 220.  
 Synopsis of the family Tellinidæ and of the North American species. Dall. 221.  
 Synopsis of the family Cariidæ and of the North American species. Dall. 222.  
 Key to the Isopods of the Atlantic coast of North America. Richardson. 223.  
 A list of fishes collected in Japan by Keinosuke Otaki and by the *Albatross*. Jordan. 224.  
 On the anatomy and relations of the Eurypharyngidæ. Gill & Ryder. 3a.  
 The lantern eels, hag-fishes, and lampreys of Japan. Jordan & Snyder. 226.  
 Four new symmetrical crabs (Pagurids) from the West India region. Benedict. 227.  
 On a slug of the genus *Veronicella*. Cockerell. 229.  
 Synopsis of the Lucinacea. Dall. 228a.  
 Review of the apodal fishes of Japan. Jordan & Snyder. 229a.  
 A new species of Iguanoid lizard from Green Cay, Bahamas. Stejneger. 229b.

*In the Bulletin and the Report of the United States National Museum:*

- Oceanic Ichthyology. Goode & Bean. 139.  
 The fishes of North and Middle America. Jordan & Everman. 163.  
 American Hydroids. Part 1. The Plumularidæ. Nutting. 218.  
 A preliminary catalogue of the shell bearing marine Mollusks and Brachiopods of the southwestern coast of the United States. Dall. 54.  
 Recent Foraminifera. A descriptive catalogue of specimens dredged by the U. S. F. C. steamer *Albatross*. Flint. 193.

*In the Bulletins and Memoirs of the Museum of Comparative Zoology:*

- Reports on dredging operations off the west coast of Central America to the Galapagos, to the west coast of Mexico and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U. S. F. C. steamer *Albatross*, Lieut. Commander Z. L. Tanner, U. S. N., commanding.  
 Three letters from Alexander Agassiz to the Hon. Marshall McDonald, U. S. Commissioner of Fish and Fisheries, on the dredging operations off the west coast of Central America, etc. Agassiz. 74.  
 Notice of *Calamocrinus diomedæ*, a new Stalked Crinoid from the Galapagos. Agassiz. 64.  
 I. *Calamocrinus diomedæ*, a new Stalked Crinoid, with notes on the homologies of Echinoderms. Agassiz. 85.  
 II. General sketch of the expedition of the *Albatross* from February to May, 1891. Agassiz. 86.  
 III. On a peculiar type of arenaceous foraminifer from the American tropical Pacific. Neusina agassizi. Goës. 94.  
 IV. Vorläufiger Bericht über die erbeuteten Holothurien. Ludwig. 107.  
 V. Rocks collected from the Galapagos Islands. Merrill. 110.  
 VI. Preliminary descriptions of new species of Crustacea. Faxon. 104.  
 VII. The Orthoptera of the Galapagos Islands. Scudder, S. 108.  
 VIII. Compte-Rendu sur les Pantopodes. Schimkéwitsch. 109.  
 IX. Report on the Turbellaria. Woodworth. 123.  
 X. Note Préliminaire sur les Alcyonaires. Studer. 121.  
 XI. The Hydroids. Clarke. 122.  
 XII. The Holothurians. Ludwig. 124.  
 XIII. Die Opisthobranchien. Bergh. 125.  
 XIV. The pelagic Schizopoda. Ortmann. 130.  
 XV. The Stalk-eyed Crustacea. Faxon. 149.  
 XVI. Die Pelagischen Copepoden. Giesbrecht. 148.  
 XVII. Birds from Cocos and Malpelo islands. Townsend. 152.  
 XVIII. Die Comatuliden. Hartlaub. 151.  
 XIX. Die Ostracoden. Muller. 150.  
 XX. The Foraminifera. Goës. 167.  
 XXI. Die Medusen. Maas. 179.  
 XXII. The Isopods. Hansen. 180.  
 XXIII. Preliminary report on the Echini. Agassiz. 183.

- In the Bulletins and Memoirs of the Museum of the Comparative Zoology—Cont'd.*  
 XXIV. Preliminary report on *Branchiocerianthus urceolus*. Mark. 191.  
 XXV. The Ophiuridæ. Lütken. 197.  
 XXVI. The Fishes. Garman. 198.  
 XXVII. Preliminary account of *Planktonemertes agassizi*. Woodworth. 206.  
 XXVIII. Description of two new lizards of the genus *Anolis* from Cocos and Malpelo islands. Stejneger. 219.  
 Descriptions of thirteen species and two genera of fishes from the *Blake* collection. Goode. 29.  
 Oceanic Ichthyology. Goode & Bean. 139.  
 Cruise of the *Albatross* in the Tropical Pacific, August 1899–March 1900, and list of the stations occupied. 225.
- In the Proceedings of the Academy of Natural Sciences of Philadelphia:*  
 Insular land-shell faunas. Dall. 161.  
 A revision of the genus *Synidotea*. Benedict. 172.
- In the United States Senate documents:*  
 Report on the Hawaiian cable survey. 89.  
 Report on the condition of seal life, Pribilof Islands. Townsend, True, and Alexander. 164.  
 Fur-seal arbitration. 152a.
- In The Auk:*  
 A new petrel for North America. Ridgway. 23.  
 Four new species of birds from the Bahama Islands. Ridgway. 38.  
 List of birds collected on the Bahama Islands. Ridgway. 81.  
 Descriptions of new ptarmigan. Elliott. 168a.
- In the Proceedings of the Biological Society of Washington:*  
 The Arcturidæ in the U. S. National Museum. Benedict. 184.  
 Diagnoses of new species of fishes from Bering Sea. Gill & Townsend. 176.  
 A new fur-seal or sea-bear (*Arctocephalus townsendi*). Merriam. 175.  
 Synopsis of the American species of *Ethusa*. Rathbun, M. J. 181.  
 Synopsis of the American species of *Palicus Philippi*. Rathbun, M. J. 182.  
 Description of a new genus and species of *Sphæromidæ* from Alaskan waters. Richardson. 173.  
 Description of a new parasitic Isopod, genus *Æga*, from southern coast of the United States. Richardson. 192.  
 Descriptions of some new species of birds from Cozumel Island, Yucatan. Ridgway. 22.
- In the documents of the Treasury Department:*  
 Observations on the fur seals of the Pribilof Islands. Jordan et al. 162.  
 Second preliminary report of the Bering Sea fur-seal investigations. Jordan et al. 186.  
 The fur seals and fur-seal islands of North Pacific Ocean. Jordan et al. 187.
- In the American Naturalist:*  
 Three new families of fishes added to the deep-sea fauna in a year. Gill. 6.  
 New deep-sea fishes. Goode & Bean. 140.  
 More deep-sea fishes. Goode & Bean. 140a.  
 On some new North American snakes. Cope. 145.  
 Synopsis of North American invertebrates. VII. Rathbun, M. J. 217.
- In the Transactions of the Connecticut Academy of Arts and Sciences:*  
 North American Ophiuroidea. I, II. Verrill. 212.  
 Revision of certain genera and species of starfishes. Verrill. 211.  
 The marine Nemerteans of New England and adjacent waters. Verrill. 97.  
 Marine Planarians of New England. Verrill. 98.  
 Supplement to the marine Nemerteans and Planarians of New England. Verrill. 158.  
 Third catalogue of Mollusca recently added to the fauna of the New England coast and the adjacent parts of the Atlantic. Verrill. 18.  
 List of deep-water and surface Mollusca. Verrill. 12.  
 Second catalogue of Mollusca recently added to the fauna of the New England coast and the adjacent parts of the Atlantic. Verrill. 11.  
 Revision of the marine Gastropods referred to *Cyclostrema*, *Adeorbis*, *Vitri-nella*, and related genera. Bush. 196.  
 Additions to the shallow water Mollusca of Cape Hatteras, N. C. Bush. 19.  
 The development of *Terebratalia obsoleta* Dall. Beecher. 103.

*In the American Journal of Science:*

- Explorations of the *Albatross* in the Pacific Ocean. (Letters.) Agassiz. 213.  
 Notice of the remarkable marine fauna occupying the outer banks of the southern coast of New England, No. 11. Verrill. 17.  
 Are there deep-sea Medusæ? Fewkes. 50.  
 Descriptions of imperfectly known and new Actinians, III. Verrill. 210.  
 Revision of the genera of Lediidæ and Nuculidæ of the Atlantic Coast of the United States. Verrill. 177.  
 The Opisthotenthidæ. Verrill. 168.  
 Distribution of the Echinoderms of Northeastern America. Verrill. 157.

*In Science:*

- The ichthyological peculiarities of the Bassalian fauna. Gill. 5.  
 Exploring expedition to the Mid-Pacific Ocean. Smith, H. M. 208.  
 Explorations of *Albatross* in the Pacific Ocean. (Letters.) Agassiz. 212a.

## MISCELLANEOUS.

*In Modern Science Series (Appletons):*

- The fauna of the deep sea. Hickson. 131.

*In the Century Magazine:*

- The United States Fish Commission. Some of its work. Rathbun, R. 96.

*In McClures Magazine:*

- The bottom of the sea. Baker. 215.

*In the Cosmopolitan Magazine:*

- The Abyssal depths of the Sea. Beard. 102.

*In the Atlantic Monthly:*

- The depths of the ocean. Goode. 58a.

*In the National Geographic Magazine:*

- Deep-sea exploring expedition of the *Albatross*. Smith, H. M. 209.

*In the Proceedings of the U. S. Naval Institute:*

- The Fish Commission and its relations with the U. S. Navy. Tanner. 134.

*In the Transactions and Proceedings of the Geographic Society of the Pacific:*

- Cable surveys from California to the Hawaiian Islands. Tanner. 88.

*In the Report of the U. S. Hydrographic Office:*

- Submarine cables. 90.

*In the Transactions of the American Fisheries Society:*

- Deep-sea dredging on the *Albatross*. Washburn. 42.

*In the Proceedings of the American Association for the Advancement of Science:*

- The present condition of the study of deep sea fishes. Goode. 91.

*In the Proceedings of the Malacological Society (London):*

- Synopsis of a review of the genera of Recent and Tertiary Mactridæ and Mesodesmatidæ. Dall. 143.

*In The Nautilus:*

- New species of land shells from the Galapagos Islands. Dall. 144.

*In the Bulletin of the Natural History Society of British Columbia:*

- Notice of some new or interesting species of shells from British Columbia and the adjacent region. Dall. 174.

*In the Bulletin of the Laboratory of Natural History of the University of Iowa:*

- The Brachyura of the biological expedition to the Florida Keys and the Bahamas in 1893. Rathbun, M. J. 188.

*In the Journal of Conchology:*

- Synopsis of the American species of the family Diplodontidæ. Dall. 194.

*In Forest and Stream:*

- Deep-sea fishing fishes. Gill. 3.

*In the Bulletin of the American Geographic Society:*

- Cruise of the *Albatross*. 98a.

*In the memoirs of the Biologic Laboratory, Johns Hopkins University:*

- The genus *Salpa*. Brooks. 99a.

*In the Scottish Geographical Magazine:*

- Address to the geographical section of the British Association. Murray, Sir John. 233.

*In Nature (British):*

- What are the Saccopharyngoid fishes? Gill. 231.

*In Zoologischer Anzeiger:*

- Note on Eurypharynx, etc. Gill & Ryder. 230.

*With cooperation of Royal Academy of Sciences, by G. Fisser, Jena:*

- Amerikanische Hexactinelliden. Schulze. 232.

## LIST OF GENERA AND SPECIES DESCRIBED AS NEW IN ALBATROSS PAPERS.

|   | No. of<br>Title. |  | No. of<br>Title. |
|---|------------------|--|------------------|
| <i>Abra longicallis americana</i> ..... | 189              | <i>Aglaophenia cristifrons</i> .....   | 218              |
| <i>Abyssicola</i> .....                 | 139              | <i>elegans</i> .....                   | 218              |
| <i>Acantharchaster</i> .....            | 156              | <i>flowersi</i> .....                  | 218              |
| <i>Acanthascus plutei</i> .....         | 232              | <i>latirostris</i> .....               | 218              |
| <i>Acanthephyra brevirostris</i> .....  | 20               | <i>mammillata</i> .....                | 218              |
| <i>cristata</i> .....                   | 104              | <i>minima</i> .....                    | 218              |
| <i>cucullata</i> .....                  | 104              | <i>octocarpa</i> .....                 | 218              |
| <i>eximea</i> .....                     | 10               | <i>rathbuni</i> .....                  | 218              |
| <i>microphthalma</i> .....              | 20               | <i>Aglaophenopsis distans</i> .....    | 218              |
| <i>Acanthochænus lutkenii</i> .....     | 6                | <i>verrilli</i> .....                  | 218              |
| <i>Acanthocottus laticeps</i> .....     | 141              | <i>Aglaura prismatica</i> .....        | 179              |
| <i>profundorum</i> .....                | 141              | <i>Albatrossia</i> .....               | 163              |
| <i>sellaris</i> .....                   | 141              | <i>Alcidea</i> .....                   | 163              |
| <i>Acanthocyclus hassleri</i> .....     | 200              | <i>Alcockia</i> .....                  | 139              |
| <i>Acanthoderes galapagoensis</i> ..... | 203              | <i>Aldrovandia gracilis</i> .....      | 139              |
| <i>Acanthogorgia brevispina</i> .....   | 121              | <i>pallida</i> .....                   | 139              |
| <i>Acanthonus spinifer</i> .....        | 198              | <i>Alepocephalus asperifrons</i> ..... | 198              |
| <i>Acanthosaccus tenuis</i> .....       | 232              | <i>convexifrons</i> .....              | 198              |
| <i>Achæus trituberculatus</i> .....     | 154              | <i>fundulus</i> .....                  | 198              |
| <i>Achelous affinis</i> .....           | 104              | <i>productus</i> .....                 | 1                |
| <i>Achryson galapagoensis</i> .....     | 203              | <i>tenebrosus</i> .....                | 93               |
| <i>Acodonaster</i> .....                | 211              | <i>Aleposomus copei</i> .....          | 6                |
| <i>Actæa angusta</i> .....              | 200              | <i>Amalopenæus valens</i> .....        | 10               |
| <i>bifrons</i> .....                    | 188              | <i>Amaroucium kincaidi</i> .....       | 187              |
| <i>inornata</i> .....                   | 200              | <i>pribilovense</i> .....              | 187              |
| <i>palmeri</i> .....                    | 153              | <i>snodgrassi</i> .....                | 187              |
| <i>Actæon curtulus</i> .....            | 63               | <i>Amphicerus frontalis</i> .....      | 203              |
| <i>hebes</i> .....                      | 18               | <i>Amphilaphis abietina</i> .....      | 121              |
| <i>perconicus</i> .....                 | 63               | <i>Amphinome lepadis</i> .....         | 41               |
| <i>Actinernus plebeius</i> .....        | 120              | <i>Amphiocnida</i> .....               | 212              |
| <i>Actinostola excelsa</i> .....        | 120              | <i>Amphioplus agassizii</i> .....      | 212              |
| <i>pergamentacea</i> .....              | 120              | <i>Amphiporus cæcus</i> .....          | 97               |
| <i>Adamsia involvens</i> .....          | 120              | <i>frontalis</i> .....                 | 97               |
| <i>Adeorbis sincera</i> .....           | 63               | <i>heterosorus</i> .....               | 97               |
| <i>Admete nodosa</i> .....              | 18               | <i>mesosorus</i> .....                 | 97               |
| <i>Ega acuminata</i> .....              | 180              | <i>multisorus</i> .....                | 97               |
| <i>ecarinata</i> .....                  | 192              | <i>tetrasorus</i> .....                | 97               |
| <i>longicornis</i> .....                | 180              | <i>Amphispiza belli cinerea</i> .....  | 82               |
| <i>maxima</i> .....                     | 180              | <i>Amphiura assimilis</i> .....        | 197              |
| <i>plebeia</i> .....                    | 180              | <i>brevipes</i> .....                  | 197              |
| <i>Egathoa linguifrons</i> .....        | 223              | <i>diomedææ</i> .....                  | 197              |
| <i>Emasia lichenosa</i> .....           | 229a             | <i>fragilis</i> .....                  | 16, 41           |
| <i>Eolidia herculea</i> .....           | 125              | <i>gastracantha</i> .....              | 197              |
| <i>Ærope fulva</i> .....                | 183              | <i>granulata</i> .....                 | 197              |
| <i>Æthoprora effulgens</i> .....        | 139              | <i>gymnogastra</i> .....               | 197              |
| <i>lucida</i> .....                     | 139              | <i>gymnopora</i> .....                 | 197              |
| <i>Æthusa ciliatifrons</i> .....        | 104              | <i>notacantha</i> .....                | 197              |
| <i>pubescens</i> .....                  | 104              | <i>papillata</i> .....                 | 197              |
| <i>Æthusina smithiana</i> .....         | 104              | <i>polyacantha</i> .....               | 197              |
| <i>Aglaophenia aperta</i> .....         | 218              | <i>seminuda</i> .....                  | 197              |
| <i>bicornuta</i> .....                  | 218              | <i>serpentina</i> .....                | 197              |
| <i>contorta</i> .....                   | 218              | <i>Ammochares artifex</i> .....        | 41               |

|  | No. of<br>Title. |                                      | No. of<br>Title. |
|--|------------------|--------------------------------------|------------------|
| <i>Ammophorus caroli</i> .....         | 203              | <i>Aristæus occidentalis</i> .....   | 104              |
| <i>Anaitis formosa</i> .....           | 41               | <i>Aristeus tridens</i> .....        | 10               |
| <i>picta</i> .....                     | 41               | <i>Artediellus pacificus</i> .....   | 141              |
| <i>Anamathia cornuta</i> .....         | 200              | <i>Ascorhynchus agassizii</i> .....  | 109              |
| <i>occidentalis</i> .....              | 104              | <i>Aspidophoroides bartoni</i> ..... | 141              |
| <i>Anaplocamus borealis</i> .....      | 166              | <i>Astacilla cæca</i> .....          | 184              |
| <i>Anasimus latus</i> .....            | 154              | <i>diomedæ</i> .....                 | 184              |
| <i>rostratus</i> .....                 | 118              | <i>Asterias austera</i> .....        | 157              |
| <i>Anaulocamera darwinii</i> .....     | 108              | <i>enopla</i> .....                  | 157              |
| <i>Ancistrocheirus megaptera</i> ..... | 18               | <i>Asteronyx dispar</i> .....        | 197              |
| <i>Ancylopsetta dendritica</i> .....   | 72               | <i>excavata</i> .....                | 197              |
| <i>Anemonia inequalis</i> .....        | 120              | <i>plana</i> .....                   | 197              |
| <i>variabilis</i> .....                | 120              | <i>Astrocladus</i> .....             | 212              |
| <i>Angelopsis globosa</i> .....        | 16, 30           | <i>Astrogeron</i> .....              | 212              |
| <i>Anilocra occidentalis</i> .....     | 202              | <i>Astronesthes gemmifer</i> .....   | 139              |
| <i>Anisodonta corbuloidea</i> .....    | 195              | <i>Astrorhiza furcata</i> .....      | 167              |
| <i>Anisolabis bormansi</i> .....       | 108              | <i>tenuis</i> .....                  | 167              |
| <i>Ankyroderma spinosum</i> .....      | 124              | <i>vermiformis</i> .....             | 167              |
| <i>Anolis agassizi</i> .....           | 219              | <i>Astroschema clavigera</i> .....   | 156              |
| <i>townsendi</i> .....                 | 219              | <i>sublæve</i> .....                 | 197              |
| <i>Antedon agassizii</i> .....         | 151              | <i>Astroscopus zephyrius</i> .....   | 171              |
| <i>brigadata</i> .....                 | 151              | <i>Atherinops insularum</i> .....    | 93               |
| <i>parvula</i> .....                   | 151              | <i>Atlanta pulchella</i> .....       | 11               |
| <i>subtilis</i> .....                  | 151              | <i>Atolla alexandri</i> .....        | 179              |
| <i>tanneri</i> .....                   | 151              | <i>bairdii</i> .....                 | 30               |
| <i>Antennarius reticularis</i> .....   | 93               | <i>gigantea</i> .....                | 179              |
| <i>Antennopsis distans</i> .....       | 218              | <i>verrillii</i> .....               | 16, 30           |
| <i>longicornæ</i> .....                | 218              | <i>Atopichthys acus</i> .....        | 198              |
| <i>nigra</i> .....                     | 218              | <i>cinctus</i> .....                 | 198              |
| <i>Antennularia americana</i> .....    | 218              | <i>cingulus</i> .....                | 198              |
| <i>geniculata</i> .....                | 218              | <i>dentatus</i> .....                | 198              |
| <i>pinnata</i> .....                   | 218              | <i>esunculus</i> .....               | 198              |
| <i>rugosa</i> .....                    | 218              | <i>falcidens</i> .....               | 198              |
| <i>Antheniaster</i> .....              | 211              | <i>longidens</i> .....               | 198              |
| <i>Anthothela argentea</i> .....       | 121              | <i>lychnus</i> .....                 | 198              |
| <i>Antimora microlepis</i> .....       | 75               | <i>obtusus</i> .....                 | 198              |
| <i>rhina</i> .....                     | 198              | <i>ophichthys</i> .....              | 198              |
| <i>Aphanostoma aurantiacum</i> .....   | 98               | <i>sicarius</i> .....                | 198              |
| <i>olivaceum</i> .....                 | 98               | <i>Attila cozumelæ</i> .....         | 37               |
| <i>Aphoristia diomedæana</i> .....     | 28               | <i>Averruncus sterletus</i> .....    | 163, 204         |
| <i>marginata</i> .....                 | 29               | <i>Axinodon ellipticus</i> .....     | 189              |
| <i>pigra</i> .....                     | 29               | <i>Axinopsis cordata</i> .....       | 189              |
| <i>pusilla</i> .....                   | 28               | <i>orbiculata inequalis</i> .....    | 189              |
| <i>Aphorme horrida</i> .....           | 232              | <i>viridis</i> .....                 | 228a             |
| <i>Aphyonius mollis</i> .....          | 29               | <i>Axinulus</i> .....                | 189              |
| <i>Apliciopsis jordani</i> .....       | 187              | <i>Axius crista-galli</i> .....      | 104              |
| <i>Aprodon cortezianus</i> .....       | 72               | <i>Azevia querna</i> .....           | 66               |
| <i>Arca profundicola</i> .....         | 18               | <i>Barathronus bicolor</i> .....     | 29               |
| <i>Archaster sepius</i> .....          | 17               | <i>Bassogigas gillii</i> .....       | 139              |
| <i>Archistes plumarius</i> .....       | 163, 187         | <i>Bassozetus nasus</i> .....        | 198              |
| <i>Arctocephalus townsendi</i> .....   | 175              | <i>normalis</i> .....                | 1                |
| <i>Arcturus bearinganus</i> .....      | 184              | <i>Bathyaگونus nigripinnis</i> ..... | 72               |
| <i>caribbæus</i> .....                 | 223              | <i>Bathyarca abyssorum</i> .....     | 189              |
| <i>glabrus</i> .....                   | 184              | <i>anomala</i> .....                 | 189              |
| <i>intermedius</i> .....               | 202              | <i>Bathyclupea argentea</i> .....    | 139              |
| <i>longispinis</i> .....               | 184              | <i>Bathydorus uncifer</i> .....      | 222              |
| <i>multispinis</i> .....               | 184              | <i>Bathygadus arcuatus</i> .....     | 29               |
| <i>murdochi</i> .....                  | 184              | <i>cavernosus</i> .....              | 28               |
| <i>tenuispinis</i> .....               | 184              | <i>favosus</i> .....                 | 29               |
| <i>Areliscus</i> .....                 | 224              | <i>longifilis</i> .....              | 28               |
| <i>Argentina sialis</i> .....          | 72               | <i>macrops</i> .....                 | 28               |
| <i>striata</i> .....                   | 139              | <i>Bathygyge grandis</i> .....       | 180              |
| <i>Argyripnus ephippiatus</i> .....    | 170              | <i>Bathylaco nigricans</i> .....     | 139              |
| <i>Argyropelecus affinis</i> .....     | 198              | <i>Bathylagus borealis</i> .....     | 141              |
| <i>caninus</i> .....                   | 198              | <i>euryops</i> .....                 | 139              |
| <i>lychnus</i> .....                   | 198              | <i>milleri</i> .....                 | 163              |

|  | No. of<br>Title. |  | No. of<br>Title. |
|--|------------------|--|------------------|
| <i>Bathylagus pacificus</i> .....        | 72               | <i>Buccinum abyssorum</i> .....              | 11               |
| <i>Bathymaster hypoplectus</i> .....     | 72               | <i>aleuticum</i> .....                       | 142              |
| <i>Bathyonus catena</i> .....            | 28               | <i>ovulum</i> .....                          | 142              |
| <i>pectoralis</i> .....                  | 28               | <i>strigillatum</i> .....                    | 95               |
| <i>Bathyphasma ovigerum</i> .....        | 141              | <i>taphrium</i> .....                        | 95               |
| <i>Bathypterois pectoralis</i> .....     | 198              | <i>viridum</i> .....                         | 63               |
| <i>ventralis</i> .....                   | 198              | <i>Bulimulus habeli</i> .....                | 115              |
| <i>Bathytroctes aequatoris</i> .....     | 139              | <i>nesioticus</i> .....                      | 161              |
| <i>alveatus</i> .....                    | 198              | <i>reibischii</i> .....                      | 144              |
| <i>alvifrons</i> .....                   | 198              | <i>tanneri</i> .....                         | 144              |
| <i>antillarum</i> .....                  | 139              | <i>Bythocaris gracilis</i> .....             | 20               |
| <i>benedicti</i> .....                   | 139              | <i>nana</i> .....                            | 20               |
| <i>inspector</i> .....                   | 198              | <i>Cactornis brevirostris</i> .....          | 57               |
| <i>stomias</i> .....                     | 72               | <i>hypoleuca</i> .....                       | 57               |
| <i>Bathyxiphus subtilis</i> .....        | 232              | <i>Cadulus albicomatus</i> .....             | 63               |
| <i>Batrachonotus brasiliensis</i> .....  | 154              | <i>carolinensis</i> .....                    | 16               |
| <i>nicholsi</i> .....                    | 154              | <i>grandis</i> .....                         | 11               |
| <i>Bela blakei</i> .....                 | 18               | <i>hepburni</i> .....                        | 174              |
| <i>rathbuni</i> .....                    | 11               | <i>incisus</i> .....                         | 19               |
| <i>subturgida</i> .....                  | 11               | <i>spectabilis</i> .....                     | 18               |
| <i>subvitrea</i> .....                   | 11               | <i>tolmiei</i> .....                         | 174              |
| <i>Benthescymus carinatus</i> .....      | 10               | <i>Calamocrinus diomedæ</i> .....            | 64               |
| <i>moratus</i> .....                     | 47               | <i>Calappa saussurei</i> .....               | 200              |
| <i>tanneri</i> .....                     | 104              | <i>sulcata</i> .....                         | 188              |
| <i>Benthocometes</i> .....               | 139              | <i>Calastacus stilirostris</i> .....         | 104              |
| <i>Benthodesmus atlanticus</i> .....     | 139              | <i>Calathura crenulata</i> .....             | 223              |
| <i>Benthodolium abyssorum</i> .....      | 11               | <i>Callechelys peninsulæ</i> .....           | 93               |
| <i>pacificum</i> .....                   | 166              | <i>Callinectes sapidus acutidens</i> .....   | 155              |
| <i>Benthodytes incerta</i> .....         | 124              | <i>Callionymus atrilabiatus</i> .....        | 198              |
| <i>Benthocetes</i> .....                 | 10               | <i>beniteguri</i> .....                      | 224              |
| <i>Benthonectes filipes</i> .....        | 20               | <i>himantophorus</i> .....                   | 139              |
| <i>Benthoptillum sertum</i> .....        | 17               | <i>Calliostoma iridium</i> .....             | 166              |
| <i>Benthosaurus grallator</i> .....      | 29               | <i>platinum</i> .....                        | 63               |
| <i>Benthoteuthis megalops</i> .....      | 18               | <i>rioensis</i> .....                        | 63               |
| <i>Beringius alenticus</i> .....         | 142              | <i>turbinum</i> .....                        | 166              |
| <i>frielei</i> .....                     | 142              | <i>Calliotectum vernicosum</i> .....         | 63               |
| <i>Biloculina dehiscens</i> .....        | 193              | <i>Callistephanus wrightii</i> .....         | 121              |
| <i>Blennius yatebei</i> .....            | 224              | <i>Callocardia albida</i> .....              | 63               |
| <i>Bodianus acanthistius</i> .....       | 93               | <i>gigas</i> .....                           | 166              |
| <i>Bogoslovius clarki</i> .....          | 187              | <i>lepta</i> .....                           | 166              |
| <i>Bollmannia chlamydes</i> .....        | 66               | <i>ovalis</i> .....                          | 166              |
| <i>macropoma</i> .....                   | 93               | <i>Callogonia angulata</i> .....             | 166              |
| <i>ocellata</i> .....                    | 93               | <i>Callorhinus alascanus</i> .....           | 187              |
| <i>stigmatura</i> .....                  | 93               | <i>curilensis</i> .....                      | 187              |
| <i>Bolocera brevicornis</i> .....        | 120              | <i>Calosoma howardi</i> .....                | 203              |
| <i>occidua</i> .....                     | 120              | <i>Colotomus xenodon</i> .....               | 72               |
| <i>pannosa</i> .....                     | 120              | <i>Calvinia mirabilis</i> .....              | 218              |
| <i>Boraportia pedaliota</i> .....        | 139              | <i>Calycosaccus ijimai</i> .....             | 232              |
| <i>Boreomysis californica</i> .....      | 130              | <i>Calycosoma validum</i> .....              | 232              |
| <i>Bornia barbadensis</i> .....          | 195              | <i>Calyptogena pacifica</i> .....            | 95               |
| <i>retifera</i> .....                    | 195              | <i>Calyptrophora agassizii</i> .....         | 121              |
| <i>Bothrocaropsis alalonga</i> .....     | 198              | <i>Camarhynchus pauper</i> .....             | 57               |
| <i>elongata</i> .....                    | 198              | <i>townsendi</i> .....                       | 57               |
| <i>riictolata</i> .....                  | 198              | <i>Cancellaria centrota</i> .....            | 166              |
| <i>Bothrocara mollis</i> .....           | 75               | <i>crawfordiana</i> .....                    | 95               |
| <i>Brachynotus jouyi</i> .....           | 118              | <i>io</i> .....                              | 166              |
| <i>Branchiostoma nakagawæ</i> .....      | 226              | <i>Cancellus ornatus</i> .....               | 227              |
| <i>Branchiocerianthus urceolus</i> ..... | 191              | <i>spongicola</i> .....                      | 227              |
| <i>Bregmaceros atlanticus</i> .....      | 29               | <i>tanneri</i> .....                         | 104              |
| <i>bathymaster</i> .....                 | 66               | <i>Capheira sulcata</i> .....                | 124              |
| <i>longipes</i> .....                    | 198              | <i>Carcinoplax dentatus</i> .....            | 118              |
| <i>Brisinga multicostata</i> .....       | 156              | <i>Cardinalis cardinalis saturatus</i> ..... | 37               |
| <i>Brissopsis columbaris</i> .....       | 183              | <i>Cardiomya abyssicola</i> .....            | 189              |
| <i>Bryssophilus</i> .....                | 163              | <i>gemma</i> .....                           | 189              |
| <i>Brythosus</i> .....                   | 224              | <i>Cardiospermum palmeri</i> .....           | 77               |



|                                | No. of<br>Title. |                                   | No. of<br>Title. |
|--------------------------------|------------------|-----------------------------------|------------------|
| Careproctus colletti .....     | 141              | Chonelasma tenerum .....          | 232              |
| ectenens .....                 | 141              | Choristella brychia .....         | 196              |
| melanurus .....                | 93               | leptalia .....                    | 196              |
| ostentum .....                 | 141              | Choristes carpenteri .....        | 166              |
| phasma .....                   | 141              | Choristodon (?) cancellatus ..... | 18               |
| simus .....                    | 141              | Chriolepis minutillus .....       | 93               |
| spectrum .....                 | 75               | Chromodoris agassizii .....       | 125              |
| Castalia cincinnata .....      | 41               | Chrysodomus acosmius .....        | 95               |
| Catætyx rubrirostris .....     | 72               | amiantus .....                    | 63               |
| simus .....                    | 198              | aphelus .....                     | 63               |
| Catapagurus diomedea .....     | 104              | eucosmius .....                   | 95               |
| Cathetostoma albigutta .....   | 105              | griseus .....                     | 63               |
| Catulus brunneus .....         | 93               | halibrectus .....                 | 95               |
| cephalus .....                 | 93               | hypolispus .....                  | 95               |
| xaniurus .....                 | 93               | insularis .....                   | 142              |
| Caudina californica .....      | 124              | ithius .....                      | 95               |
| Caulolepis longidens .....     | 1, 199, 205      | magnus .....                      | 142              |
| subulidens .....               | 198              | periscelidus .....                | 95               |
| Caulophacus agassizii .....    | 232              | phoeniceus .....                  | 95               |
| Caulophryne jordani .....      | 139              | testudinis .....                  | 63               |
| Celema .....                   | 139              | Cilicæa caudata gilliana .....    | 202              |
| Centrithmus signifer .....     | 198              | cordata .....                     | 202              |
| Centropages elegans .....      | 148              | granulosa .....                   | 202              |
| Centropomus constantinus ..... | 171              | linguicauda .....                 | 223              |
| Centrosyllium nigrum .....     | 198              | Cingula apicina .....             | 11               |
| Centruroides luctifer .....    | 67               | brychia .....                     | 11               |
| Centurus blakei .....          | 38               | leptalea .....                    | 11               |
| dubius leei .....              | 37               | sandersoni .....                  | 11               |
| nyeanus .....                  | 38               | syngenes .....                    | 11               |
| rubriventris pygmæus .....     | 37               | Circulus dalli .....              | 196              |
| Cephus snowi .....             | 201              | Cirolana albida .....             | 223              |
| Ceratocottus lucasi .....      | 187              | linguifrons .....                 | 202              |
| Ceratomyx spinosa .....        | 104              | obtruncata .....                  | 223              |
| Cerianthus vas .....           | 120              | Cirrhotenthis megatera .....      | 18               |
| Certhidea cinerascens .....    | 57               | plena .....                       | 18               |
| Certhiola tricolor .....       | 21               | Citharichthys dinoceros .....     | 29               |
| Cetoconcha atypa .....         | 189              | fragilis .....                    | 72               |
| Cetomimus gillii .....         | 136, 139         | maculifer .....                   | 198              |
| storeri .....                  | 136, 139         | platophrys .....                  | 73               |
| Chalinura brevibarbis .....    | 139              | ventralis .....                   | 28               |
| ctenomelas .....               | 170              | xanthostigma .....                | 72               |
| filifera .....                 | 141              | Cithna cingulata .....            | 11               |
| serrula .....                  | 75               | Cithna (?) olivacea .....         | 11               |
| Charybdea arborifera .....     | 179              | Cladaster rudis .....             | 211              |
| Chasmocarcinus latipes .....   | 200              | Cladiscus agassizii .....         | 121              |
| obliquus .....                 | 188              | Cladocarpus carinatus .....       | 218              |
| typicus .....                  | 188              | flexilis .....                    | 41               |
| Chauliodus barbatus .....      | 198              | flexuosus .....                   | 218              |
| dentatus .....                 | 198              | grandis .....                     | 218              |
| macouni .....                  | 75               | obliquus .....                    | 218              |
| Chaunax coloratus .....        | 198              | septatus .....                    | 218              |
| Chiarella centripetalis .....  | 179              | Claviscopulia intermedia .....    | 223              |
| Chiasmodon subniger .....      | 198              | Clavularia gregaria .....         | 121              |
| Chimæra abbreviata .....       | 1                | Cleantis heathii .....            | 202              |
| phantasma .....                | 224              | occidentalis .....                | 202              |
| Chionecetes tanneri .....      | 119              | Clidophora inornata .....         | 189              |
| Chirundina streetsii .....     | 148              | Closteridea bauri .....           | 108              |
| Chitonanthus .....             | 120              | Cocculina conica .....            | 11               |
| Chloopsis equatorialis .....   | 92               | dalli .....                       | 11               |
| fierasfer .....                | 229a             | pocillum .....                    | 63               |
| gilbertii .....                | 198              | reticulata .....                  | 18               |
| Chlorophthalmus mento .....    | 198              | Cocornis agassizii .....          | 152              |
| proridens .....                | 170              | Codakia chiquita .....            | 228a             |
| truculentus .....              | 139              | colpoica .....                    | 228a             |
| Chlorostilbon forficatus ..... | 37               | cubana .....                      | 228a             |

|  | No. of<br>Title. |  | No. of<br>Title. |
|--|------------------|--|------------------|
| <i>Codakia galapagana</i> .....            | 228a             | <i>Crystallichthys mirabilis</i> .....     | 163, 187         |
| <i>mexicana</i> .....                      | 228a             | <i>Culeolus tanneri</i> .....              | 41               |
| <i>portoricana</i> .....                   | 228a             | <i>Cuspidaria chilensis</i> .....          | 63               |
| <i>Cœlocephalus acipenserinus</i> .....    | 170              | <i>formosa</i> .....                       | 189              |
| <i>Cœlocerus grandis</i> .....             | 119              | <i>fraterna</i> .....                      | 189              |
| <i>Cœlorhynchus gladius</i> .....          | 170              | <i>media</i> .....                         | 189              |
| <i>kishinouyei</i> .....                   | 224              | <i>monosteira</i> .....                    | 63               |
| <i>Colidotea</i> .....                     | 202              | <i>parva</i> .....                         | 189              |
| <i>Colletia</i> .....                      | 139              | <i>turgida</i> .....                       | 189              |
| <i>Collodes armatus</i> .....              | 188              | <i>ventricosa</i> .....                    | 189              |
| <i>leptocheles</i> .....                   | 154              | <i>Cyclodorippe granulata</i> .....        | 188              |
| <i>tenuirostris</i> .....                  | 113              | <i>Cyclopsetta chittendeni</i> .....       | 135              |
| <i>tumidus</i> .....                       | 200              | <i>Cyclorhis insularis</i> .....           | 37               |
| <i>Collossendeis bicincta</i> .....        | 109              | <i>Cyclostrema affine</i> .....            | 11               |
| <i>gracilis pallida</i> .....              | 109              | <i>cingulatum</i> .....                    | 11               |
| <i>macerrima minor</i> .....               | 109              | <i>dalli ornatum</i> .....                 | 11               |
| <i>subminuta</i> .....                     | 109              | <i>diaphanum</i> .....                     | 11               |
| <i>Columbella permodesta</i> .....         | 63               | <i>Cyclostremella humilis</i> .....        | 196              |
| <i>Cóminella brunneocincta</i> .....       | 166              | <i>Cyclothone acclinidens</i> .....        | 198              |
| <i>Conchoecia agassizii</i> .....          | 150              | <i>signata</i> .....                       | 198              |
| <i>Conger muræna æquorea</i> .....         | 170              | <i>Cyclothyca corrugata</i> .....          | 68               |
| <i>caudalis</i> .....                      | 198              | <i>Cycloxanthus californiensis</i> .....   | 118              |
| <i>flava</i> .....                         | 139              | <i>Cylichna cæata</i> .....                | 19               |
| <i>Congrellus meeki</i> .....              | 224              | <i>eburnea</i> .....                       | 18               |
| <i>Congrosoma evermanni</i> .....          | 198              | <i>Cymatoica occidentalis</i> .....        | 63               |
| <i>Conocara macdonaldi</i> .....           | 139              | <i>orientalis</i> .....                    | 63               |
| <i>Conocephalus insulanus</i> .....        | 108              | <i>Cymbactis fœculenta</i> .....           | 120              |
| <i>Conomitra intermedia</i> .....          | 63               | <i>Cymopolia fragilis</i> .....            | 118              |
| <i>Corallana sexticornis</i> .....         | 223              | <i>tuberculata</i> .....                   | 104              |
| <i>truncata</i> .....                      | 202              | <i>zonata</i> .....                        | 118              |
| <i>Corvula sanctæ-luciæ</i> .....          | 65               | <i>Cynicoglossus bathybius</i> .....       | 72               |
| <i>Coryphœnoides sulcatus</i> .....        | 28               | <i>Cynoscion macdonaldi</i> .....          | 72               |
| <i>Cottus aleuticus</i> .....              | 141              | <i>Cyrtomaia smithi</i> .....              | 118              |
| <i>Cradactis digitata</i> .....            | 120              | <i>Cystechinus loveni</i> .....            | 183              |
| <i>Crangon communis</i> .....              | 187              | <i>rathbuni</i> .....                      | 183              |
| <i>Crenella columbiana</i> .....           | 174              | <i>Cythara victoriana</i> .....            | 174              |
| <i>fragilis</i> .....                      | 18               | <i>Cytherea eucymata</i> .....             | 63               |
| <i>japonica</i> .....                      | 174              | <i>Cyttus hololepis</i> .....              | 139              |
| <i>leana</i> .....                         | 174              | <i>Dactyloscopus lunaticus</i> .....       | 72               |
| <i>Cribrella pectinata</i> .....           | 156              | <i>Dactylostomias filifer</i> .....        | 198              |
| <i>Crithionina granum subsimplex</i> ..... | 167              | <i>Dasycottus setiger</i> .....            | 75               |
| <i>lens</i> .....                          | 167              | <i>Dasygorgia fruticosa</i> .....          | 121              |
| <i>pisum</i> .....                         | 167              | <i>Dasyscopelus pristilepis</i> .....      | 170              |
| <i>pisum hispida</i> .....                 | 193              | <i>Deima pacificum</i> .....               | 124              |
| <i>rugosa</i> .....                        | 167              | <i>Delphinula nitida</i> .....             | 18               |
| <i>Cristellaria limbata</i> .....          | 193              | <i>Dendrodoa subpedunculata</i> .....      | 187              |
| <i>Crossaster helianthus</i> .....         | 156              | <i>tuberculata</i> .....                   | 187              |
| <i>Crucigera websteri</i> .....            | 43               | <i>Dendroica petechia rufivertex</i> ..... | 37               |
| <i>Crypticne elongata</i> .....            | 180              | <i>rufopileata</i> .....                   | 21               |
| <i>Cryptodon brevis</i> .....              | 189              | <i>Dentalium complexum</i> .....           | 142              |
| <i>croulinensis altus</i> .....            | 189              | <i>laqueatum</i> .....                     | 18               |
| <i>equalis</i> .....                       | 189              | <i>leptum</i> .....                        | 16               |
| <i>fuegiensis</i> .....                    | 63               | <i>megathyris</i> .....                    | 63               |
| <i>grandis</i> .....                       | 18               | <i>phaneum</i> .....                       | 142              |
| <i>inequalis</i> .....                     | 189              | <i>solidum</i> .....                       | 11               |
| <i>insignis</i> .....                      | 189              | <i>Derepodichthys alepidotus</i> .....     | 141              |
| <i>obsoletus</i> .....                     | 189              | <i>Derichthys serpentinus</i> .....        | 6                |
| <i>ovatus</i> .....                        | 189              | <i>Dermatodiadema globulosum</i> .....     | 183              |
| <i>planus</i> .....                        | 189              | <i>horridum</i> .....                      | 183              |
| <i>plicatus</i> .....                      | 18               | <i>Desmophyllum nobile</i> V.....          | 17               |
| <i>pygmæus</i> .....                       | 189              | <i>Desmopleura concinna</i> .....          | 108              |
| <i>simplex</i> .....                       | 189              | <i>Dialithocidaris gemmifera</i> .....     | 183              |
| <i>Cryptophris concharum</i> .....         | 118              | <i>Dialommus fuscus</i> .....              | 73               |
| <i>Cryptopsaras couesii</i> .....          | 3                | <i>Diaphus chrysorhynchus</i> .....        | 170              |
| <i>Cryptotrema corallinum</i> .....        | 72               | <i>urolampus</i> .....                     | 170              |
| <i>Crystallichthys</i> .....               | 163, 187         | <i>Dibranchichthys nudivomer</i> .....     | 198              |

|                                  | No. of<br>Title. |                                   | No. of<br>Title. |
|----------------------------------|------------------|-----------------------------------|------------------|
| Dibranchopsis.....               | 198              | Ericara salmonea.....             | 176              |
| Dibranchus asper.....            | 198              | Ericerus latimanus.....           | 118              |
| hystrix.....                     | 198              | Erichsonella floridana.....       | 223              |
| scaber.....                      | 198              | Erileptus spinosus.....           | 118              |
| Dicrolene filamentosa.....       | 198              | Erimacrus.....                    | 100, 101         |
| nigra.....                       | 198              | Erycina compressa.....            | 195              |
| pullata.....                     | 198              | emmonsi.....                      | 195              |
| Dicromita agassizii.....         | 139              | fernandina.....                   | 195              |
| Dicrotus parvipinnis.....        | 139              | linella.....                      | 195              |
| Diplacanthopoma jordani.....     | 198              | periscopiana.....                 | 195              |
| Diplectrum euryplectrum.....     | 66               | Eryonicus spinulosus.....         | 104              |
| sciurus.....                     | 93               | Eteliscus.....                    | 224              |
| Diplodonta aleutica.....         | 228a             | Ethalia multistriata.....         | 11               |
| platensis.....                   | 194              | Ethusa lata.....                  | 118              |
| Diplopteron grande.....          | 218              | tenuipes.....                     | 181              |
| longipinna.....                  | 218              | Ethusina abyssicola.....          | 10               |
| quadricorne.....                 | 218              | Etropus rimosus.....              | 28               |
| Discopyge ommata.....            | 66               | Etrumeus acuminatus.....          | 72               |
| Distichoptilum verrillii.....    | 121              | Euchæta tonsa.....                | 148              |
| Distichus smithi.....            | 203              | Euciroa pacifica.....             | 142              |
| Dolopichthys allector.....       | 198              | Eucopia sculpticauda.....         | 104              |
| Doridium diomedæum.....          | 125              | Eucosmia lurida.....              | 174              |
| ocelligerum.....                 | 125              | Eucratopsis macrophthalma.....    | 200              |
| purpureum.....                   | 125              | Euetheia olivacea intermedia..... | 37               |
| Dorocidaris panamensis.....      | 183              | Eugoniaster.....                  | 211              |
| Dynamene angulata.....           | 223              | Eulamia platyrhynchus.....        | 99               |
| benedicti.....                   | 202              | Eulimella charissa.....           | 11               |
| dilatata.....                    | 202              | (or Menestho) lissa.....          | 11               |
| glabra.....                      | 202              | lucida.....                       | 11               |
| tuberculosa.....                 | 202              | nitida.....                       | 11               |
| Ebalia americana.....            | 118              | Eunephrops bairdi.....            | 40               |
| cristata.....                    | 200              | Eupagurus alaskensis.....         | 101              |
| Eburia bauri.....                | 203              | albus.....                        | 101              |
| lanigera.....                    | 203              | aleuticus.....                    | 101              |
| Echidna cocosa.....              | 198              | beringanus.....                   | 101              |
| hishinouri.....                  | 229a             | brandti.....                      | 101              |
| scabra.....                      | 198              | californiensis.....               | 101              |
| Echinocerus diomedæ.....         | 104              | capillatus.....                   | 101              |
| Echinocrepis setigera.....       | 183              | cervicornis.....                  | 101              |
| Echineus pentagonus.....         | 154              | confragosus.....                  | 101              |
| Echiostoma margarita.....        | 139              | corallinus.....                   | 101              |
| Ectæsthesius bifrons.....        | 200              | cornutus.....                     | 101              |
| Ectreposebastes.....             | 198              | coronatus.....                    | 101              |
| imus.....                        | 198              | curacaoensis.....                 | 101              |
| Edwardsia intermedia.....        | 120              | dalli.....                        | 101              |
| Elainea cinerascens.....         | 21               | defensus.....                     | 101              |
| Eianura forficata.....           | 141              | exilis.....                       | 101              |
| Electrona.....                   | 139              | floridanus.....                   | 101              |
| Eledonella pygmæa.....           | 11               | gilli.....                        | 101              |
| Emarginula flabellum.....        | 166              | gladius.....                      | 101              |
| hawaiiensis.....                 | 142              | hemphilli.....                    | 101              |
| Emblemaria oculocirris.....      | 171              | hispidus.....                     | 101              |
| Embryx.....                      | 163              | impresus.....                     | 101              |
| Emmnion bristolæ.....            | 171              | kennerlyi.....                    | 101              |
| Empidonax gracilis.....          | 37               | mexicanus.....                    | 101              |
| Engyophrys sancti-laurentii..... | 66               | minutus.....                      | 101              |
| Enneistus.....                   | 163              | munitus.....                      | 101              |
| Ensis californicus.....          | 216              | newcombei.....                    | 101              |
| Entomacrodus cruentatus.....     | 198              | parvus.....                       | 101              |
| Ephyrina benedicti.....          | 20               | patagoniensis.....                | 101              |
| Ephyroides.....                  | 16, 30           | purpuratus.....                   | 101              |
| rotaformis.....                  | 30               | rathbuni.....                     | 101              |
| Epigonus occidentalis.....       | 139              | roseus.....                       | 101              |
| Epinephelus niphobles.....       | 171              | setosus.....                      | 101              |
| Eretmichthys ocella.....         | 198              | smithi.....                       | 101              |
| pinnatus.....                    | 198              | tanneri.....                      | 101              |

|                                      | No. of<br>Title. |  | No. of<br>Title. |
|--------------------------------------|------------------|--|------------------|
| <i>Eupagurus townsendi</i> .....     | 101              | <i>Gonodactylus spinosus</i> .....         | 147              |
| <i>undosus</i> .....                 | 101              | <i>Goniocidaris doederleini</i> .....      | 183              |
| <i>varians</i> .....                 | 101              | <i>Gorgonocephalus diomedæ</i> .....       | 197              |
| <i>Eupanopeus</i> .....              | 188              | <i>Grammatostomias dentatus</i> .....      | 139              |
| <i>Euphausia diomedæ</i> .....       | 130              | <i>Granigyra spinulosa</i> .....           | 196              |
| <i>Euphronides tanneri</i> .....     | 124              | <i>Gryllus galapageius</i> .....           | 108              |
| <i>verrucosa</i> .....               | 124              | <i>Gymnelis conorhynchus</i> .....         | 198              |
| <i>Euprognatha bifida</i> .....      | 118              | <i>Gymnobela brevis</i> .....              | 18               |
| <i>granulata</i> .....               | 104              | <i>curta</i> .....                         | 11               |
| <i>Eurete erectum</i> .....          | 232              | <i>curta subangulata</i> .....             | 11               |
| <i>Eurycope caribbea</i> .....       | 223              | <i>engonia</i> .....                       | 11               |
| <i>caudata</i> .....                 | 202              | <i>Gymnophiura cærulescens</i> .....       | 197              |
| <i>pulchra</i> .....                 | 180              | <i>mollis</i> .....                        | 197              |
| <i>scabra</i> .....                  | 180              | <i>Gyrinichthys minytrems</i> .....        | 141              |
| <i>Eurylepta maculosa</i> .....      | 98               | <i>Halcurias pilatus</i> .....             | 120              |
| <i>Eurypharyngidæ</i> .....          | 3a, 6            | <i>Halichoeres sellifer</i> .....          | 72               |
| <i>Eustylochus</i> .....             | 98               | <i>Halecium argenteum</i> .....            | 122              |
| <i>Eusymmerus antennatus</i> .....   | 202              | <i>Halicornaria longicauda</i> .....       | 218              |
| <i>Exocetus xenopterus</i> .....     | 72               | <i>variabilis</i> .....                    | 218              |
| <i>Farrea aculeata</i> .....         | 232              | <i>Halientæa spongiosa</i> .....           | 72               |
| <i>convolvulus</i> .....             | 232              | <i>Halieutopsis tumifrons</i> .....        | 198              |
| <i>Fraxinus herendeenensis</i> ..... | 129              | <i>Haliporus doris</i> .....               | 104              |
| <i>Frevillea quadridentata</i> ..... | 188              | <i>nereus</i> .....                        | 104              |
| <i>Freyella aspera</i> .....         | 156              | <i>thetis</i> .....                        | 104              |
| <i>microspina</i> .....              | 156              | <i>Halistylus columna</i> .....            | 63               |
| <i>Frieleia halli</i> .....          | 142              | <i>Halmenus robustus</i> .....             | 108              |
| <i>Fusus rufocaudatus</i> .....      | 166              | <i>Halonympha striatella</i> .....         | 189              |
| <i>Gaidius pungens</i> .....         | 148              | <i>Halosaurus attenuatus</i> .....         | 198              |
| <i>Galacantha bairdii</i> .....      | 10               | <i>goodei</i> .....                        | 1                |
| <i>diomedæ</i> .....                 | 104              | <i>guntheri</i> .....                      | 139              |
| <i>Galapagia</i> .....               | 108              | <i>radiatus</i> .....                      | 198              |
| <i>Gargamella immaculata</i> .....   | 125              | <i>Haplophragmium helicoideum</i> .....    | 167              |
| <i>Gastropteron pacificum</i> .....  | 125              | <i>lituolinoideum</i> .....                | 167              |
| <i>Gastropsetta frontalis</i> .....  | 135              | <i>obsoletum</i> .....                     | 167              |
| <i>Gastrostomus bairdii</i> .....    | 3a, 4            | <i>Harporhynchus guttatus</i> .....        | 37               |
| <i>Gecarcinus malpilensis</i> .....  | 104              | <i>Harriotta raleighana</i> .....          | 138, 139         |
| <i>Geitodoris immunda</i> .....      | 125              | <i>Helicolenus maderensis</i> .....        | 139              |
| <i>Gelasimus coloradensis</i> .....  | 118              | <i>Helix coloradoensis</i> .....           | 68               |
| <i>gracilis</i> .....                | 118              | <i>magdalensis</i> .....                   | 68               |
| <i>latimanus</i> .....               | 118              | <i>Helminthophila celata sordida</i> ..... | 82               |
| <i>Geospiza conirostris</i> .....    | 57               | <i>Hemipeneus triton</i> .....             | 104              |
| <i>media</i> .....                   | 57               | <i>Hemirhombus fimbriatus</i> .....        | 28               |
| <i>Geositta longipennis</i> .....    | 56               | <i>Hemithyris beecheri</i> .....           | 142              |
| <i>Geothlypis coryi</i> .....        | 38               | <i>craneana</i> .....                      | 142              |
| <i>tanneri</i> .....                 | 38               | <i>Hemitripteris marmoratus</i> .....      | 75               |
| <i>Gigantocypris pellucida</i> ..... | 150              | <i>Hemus analogus</i> .....                | 200              |
| <i>Gigliolia moseleyi</i> .....      | 137, 139         | <i>Hepatus lineatus</i> .....              | 200              |
| <i>Gillellus arenicolus</i> .....    | 72               | <i>Hepomadus tener</i> .....               | 10               |
| <i>ornatus</i> .....                 | 93               | <i>Heterocarpus affinis</i> .....          | 104              |
| <i>semicinctus</i> .....             | 72               | <i>hostilis</i> .....                      | 104              |
| <i>Glyphocrangon alata</i> .....     | 104              | <i>vicarius</i> .....                      | 104              |
| <i>sicarius</i> .....                | 104              | <i>Heterochæta tanneri</i> .....           | 148              |
| <i>spinulosa</i> .....               | 104              | <i>Heterostylochus</i> .....               | 98               |
| <i>Gnathophausia dentata</i> .....   | 104              | <i>Hippasteria caribæa</i> .....           | 211              |
| <i>Gnathophyllum panamense</i> ..... | 104              | <i>Himatella trophina</i> .....            | 125              |
| <i>Gnathypops snyderi</i> .....      | 163              | <i>Hippoglossina bollmani</i> .....        | 72               |
| <i>Gobiesox eigenmanni</i> .....     | 72               | <i>vagrans</i> .....                       | 198              |
| <i>funnebris</i> .....               | 72               | <i>Hippoglossoides hamiltoni</i> .....     | 163, 187         |
| <i>humeralis</i> .....               | 72               | <i>robustus</i> .....                      | 176              |
| <i>papillifer</i> .....              | 72               | <i>Histiobranchus infernalis</i> .....     | 1                |
| <i>Gobio biwæ</i> .....              | 224              | <i>Holacanthus clarionensis</i> .....      | 72               |
| <i>mayedæ</i> .....                  | 224              | <i>Holascus undulatus</i> .....            | 232              |
| <i>Gobiosoma crescentalis</i> .....  | 93               | <i>iodocus</i> .....                       | 171              |
| <i>Gobius dalli</i> .....            | 72               | <i>Holcomycteronus digittatus</i> .....    | 198              |
| <i>microdon</i> .....                | 93               | <i>Holoplites</i> .....                    | 154              |
| <i>zebra</i> .....                   | 72               | <i>Holospira arizonensis</i> .....         | 68               |

## 550 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

|                                      | No. of<br>Title. |   | No. of<br>Title. |
|--------------------------------------|------------------|---|------------------|
| <i>Holospira semisculpta</i> .....   | 68               | <i>Lætmogone theeli</i> .....               | 124              |
| <i>Holotharoidea</i> .....           | 107              | <i>Lætmophasma fecundum</i> .....           | 124              |
| <i>Homœonema typicum</i> .....       | 179              | <i>Lagena castanea</i> .....                | 193              |
| <i>Homolampus hastata</i> .....      | 183              | <i>Lagopus evermanni</i> .....              | 168a             |
| <i>Hoplostethus pacificus</i> .....  | 198              | <i>rupestris townsendi</i> .....            | 168a             |
| <i>Hoplunnis diomedianus</i> .....   | 139              | <i>Lambrus exilipes</i> .....               | 118              |
| <i>Hyalonema hercules</i> .....      | 232              | <i>hassleri</i> .....                       | 104              |
| <i>ovuliferum</i> .....              | 232              | <i>Lampadena speculigera</i> .....          | 139              |
| <i>populiferum</i> .....             | 232              | <i>Lampanyctus alatus</i> .....             | 139              |
| <i>Hyalonemertes atlantica</i> ..... | 97               | <i>gemmifer</i> .....                       | 139              |
| <i>Hyastinus caribbæus</i> .....     | 119              | <i>guntheri</i> .....                       | 139              |
| <i>Hydroides protulicola</i> .....   | 43               | <i>lacerta</i> .....                        | 139              |
| <i>spongicola</i> .....              | 43               | <i>Lampornis prevosti thalassinus</i> ..... | 37               |
| <i>Hymenaster modestus</i> .....     | 17               | <i>Lamprogrammus illustris</i> .....        | 198              |
| <i>regalis</i> .....                 | 157              | <i>Larimus acclivus</i> .....               | 163              |
| <i>Hymenocephalus antroëus</i> ..... | 170              | <i>pacificus</i> .....                      | 66               |
| <i>Hymenodora gracilis</i> .....     | 47               | <i>Leanira robusta</i> .....                | 41               |
| <i>Hymenopenæus microps</i> .....    | 10               | <i>Leda bushiana</i> .....                  | 11               |
| <i>modestus</i> .....                | 39               | <i>cestrota</i> .....                       | 63               |
| <i>robustus</i> .....                | 39               | <i>extenuata</i> .....                      | 174              |
| <i>Hyperchoristus tanneri</i> .....  | 1                | <i>platessa</i> .....                       | 63               |
| <i>Hypoclydonia bella</i> .....      | 139              | <i>pontonina</i> .....                      | 63               |
| <i>Hypopeltarium dextrum</i> .....   | 188              | <i>Ledella messanensis sublevis</i> .....   | 189              |
| <i>Ianthe erostrata</i> .....        | 202              | <i>parva</i> .....                          | 177              |
| <i>triangulata</i> .....             | 202              | <i>Leiocephalus virescens</i> .....         | 229b             |
| <i>Icelinus borealis</i> .....       | 141              | <i>Leiotealia badia</i> .....               | 120              |
| <i>cavifrons</i> .....               | 72               | <i>Leodice benedicti</i> .....              | 41               |
| <i>filamentosus</i> .....            | 72               | <i>Lepeopus forcipatus</i> .....            | 146              |
| <i>fimbriatus</i> .....              | 72               | <i>Lepidion vercundum</i> .....             | 171              |
| <i>oculatus</i> .....                | 72               | <i>Lepidisis inermis</i> .....              | 121              |
| <i>tenuis</i> .....                  | 72               | <i>Lepræa abyssicola</i> .....              | 41               |
| <i>Icelus canaliculatus</i> .....    | 141              | <i>Leptasterias hispidella</i> .....        | 157              |
| <i>euryops</i> .....                 | 75               | <i>Leptaxinus minutus</i> .....             | 189              |
| <i>scutiger</i> .....                | 75               | <i>Lepteces ornatus</i> .....               | 119              |
| <i>spiniger</i> .....                | 141              | <i>Leptoblennius mackayi</i> .....          | 141              |
| <i>vicinalis</i> .....               | 141              | <i>Leptocephalus erebennus</i> .....        | 229a             |
| <i>Icterus curasoensis</i> .....     | 21               | <i>kiusiuanus</i> .....                     | 229a             |
| <i>Idiacanthus antrostomus</i> ..... | 72               | <i>nystromi</i> .....                       | 229a             |
| <i>Iliacantha liodactylus</i> .....  | 188              | <i>retroinctus</i> .....                    | 229a             |
| <i>Ilyophis brunneus</i> .....       | 92               | <i>riukiuanus</i> .....                     | 229a             |
| <i>Inachoides intermedius</i> .....  | 154              | <i>Leptochilichthys agassizi</i> .....      | 198              |
| <i>magdalenensis</i> .....           | 118              | <i>Leptogyra eritmeta</i> .....             | 196              |
| <i>Insidiator</i> .....              | 224              | <i>inconspicua</i> .....                    | 196              |
| <i>Ipnops agassizii</i> .....        | 198              | <i>verrilli</i> .....                       | 196              |
| <i>Iridio kirschii</i> .....         | 163              | <i>Leptolithodes multispinus</i> .....      | 146              |
| <i>Irona foveolata</i> .....         | 180              | <i>papillatus</i> .....                     | 146              |
| <i>Isaster bairdii</i> .....         | 156              | <i>Leptophidium cervinum</i> .....          | 27               |
| <i>Ishikaui</i> .....                | 224              | <i>emmelas</i> .....                        | 72               |
| <i>Jæropsis lobata</i> .....         | 202              | <i>marmoratum</i> .....                     | 27               |
| <i>Juglans townsendi</i> .....       | 129              | <i>microlepis</i> .....                     | 72               |
| <i>Jumala brychia</i> .....          | 18               | <i>pardale</i> .....                        | 72               |
| <i>Kareius</i> .....                 | 224              | <i>prorates</i> .....                       | 66               |
| <i>Kathetostoma averruncus</i> ..... | 66               | <i>stigmatistium</i> .....                  | 72               |
| <i>Kelliella nitida</i> .....        | 18               | <i>Leptophycis filifer</i> .....            | 198              |
| <i>Kelliopsis</i> .....              | 189              | <i>Leptoplana angusta</i> .....             | 98               |
| <i>Kennerlia brevis</i> .....        | 189              | <i>virilis</i> .....                        | 98               |
| <i>Konosirus</i> .....               | 224              | <i>Leptoteuthis diaphana</i> .....          | 11               |
| <i>Kophobelemnion affine</i> .....   | 121              | <i>Lethotremus muticus</i> .....            | 141              |
| <i>Kuhlia arge</i> .....             | 66               | <i>Leucicorpus lusciosus</i> .....          | 198              |
| <i>Labichthys bowersii</i> .....     | 198              | <i>Leuckartia grandis</i> .....             | 148              |
| <i>carinatus</i> .....               | 2                | <i>Leucosyrinx goodei</i> .....             | 63               |
| <i>elongatus</i> .....               | 2                | <i>persimilis</i> .....                     | 63               |
| <i>gilli</i> .....                   | 75               | <i>Leuresthes crameri</i> .....             | 163, 171         |
| <i>Labrosomus cremnobates</i> .....  | 72               | <i>Leuroglossus stilbius</i> .....          | 72               |
| <i>Læmonema gracillipes</i> .....    | 198              | <i>Libinia macdonaldi</i> .....             | 106              |
| <i>melanurum</i> .....               | 139              | <i>mexicana</i> .....                       | 106              |

|   | No. of<br>Title. |  | No. of<br>Title. |
|---|------------------|--|------------------|
| <i>Libinia spinimana</i> .....          | 106              | <i>Lycodopsis scaurus</i> .....          | 198              |
| <i>Lictorella geniculata</i> .....      | 122              | <i>Lyconectes aleutensis</i> .....       | 141              |
| <i>Limanda proboscidea</i> .....        | 141              | <i>Lyonsia granulifera</i> .....         | 189              |
| <i>Limatula hyalina</i> .....           | 189              | <i>Lyonsiella alaskana</i> .....         | 142              |
| <i>nodulosa</i> .....                   | 189              | <i>cordata</i> .....                     | 189              |
| <i>regularis</i> .....                  | 189              | <i>Lysiosquilla biminienis</i> .....     | 147              |
| <i>Limopsis affinis</i> .....           | 18               | <i>Lytocarpus clarkei</i> .....          | 218              |
| <i>compressus</i> .....                 | 166              | <i>curtus</i> .....                      | 218              |
| <i>plana</i> .....                      | 18               | <i>furcatus</i> .....                    | 218              |
| <i>profundicola</i> .....               | 189              | <i>Macandrevia americana</i> .....       | 142              |
| <i>sulcata</i> .....                    | 189              | <i>craniella</i> .....                   | 142              |
| <i>vaginatus</i> .....                  | 95               | <i>diamantina</i> .....                  | 142              |
| <i>Lineus bicolor</i> .....             | 97               | <i>Macdonaldia</i> .....                 | 137, 139         |
| <i>Liocephalus loxogrammus</i> .....    | 49               | <i>alta</i> .....                        | 176              |
| <i>Lioglossina tetrophthalmus</i> ..... | 72               | <i>longa</i> .....                       | 176              |
| <i>Liopropoma longilepis</i> .....      | 198              | <i>Macoma alaskana</i> .....             | 221              |
| <i>Liothyryna clarkeana</i> .....       | 142              | <i>extenuata</i> .....                   | 221              |
| <i>Lipæsthesius leeanus</i> .....       | 200              | <i>krausei</i> .....                     | 221              |
| <i>Liparis cyclostigma</i> .....        | 141              | <i>inflatula</i> .....                   | 174              |
| <i>fucensis</i> .....                   | 141              | <i>liotricha</i> .....                   | 174              |
| <i>Lipogenys gillii</i> .....           | 137, 139         | <i>panamensis</i> .....                  | 221              |
| <i>Lissa aurivilliusi</i> .....         | 200              | <i>phenax</i> .....                      | 221              |
| <i>tuberosa</i> .....                   | 200              | <i>sitkana</i> .....                     | 221              |
| <i>Lissospira (?) convexa</i> .....     | 196              | <i>tageliformis</i> .....                | 221              |
| <i>(Ganesa) abyssicola</i> .....        | 196              | <i>Macrocoeloma tenuirostra</i> .....    | 106              |
| <i>(Ganesa?) rarinata</i> .....         | 196              | <i>Macrourus ectenes</i> .....           | 170              |
| <i>striata</i> .....                    | 196              | <i>gibber</i> .....                      | 170              |
| <i>Lithodes æquispinus</i> .....        | 146              | <i>holocentrus</i> .....                 | 170              |
| <i>brevipes</i> .....                   | 146              | <i>propinquus</i> .....                  | 170              |
| <i>californiensis</i> .....             | 146              | <i>Macrurus anguliceps</i> .....         | 198              |
| <i>camtschaticus</i> .....              | 146              | <i>barbiger</i> .....                    | 198              |
| <i>couesi</i> .....                     | 146              | <i>boops</i> .....                       | 198              |
| <i>diomedææ</i> .....                   | 146              | <i>bucephalus</i> .....                  | 198              |
| <i>goodei</i> .....                     | 146              | <i>bulbiceps</i> .....                   | 198              |
| <i>panamensis</i> .....                 | 104              | <i>canus</i> .....                       | 198              |
| <i>rathbuni</i> .....                   | 146              | <i>capito</i> .....                      | 198              |
| <i>Litonotaster</i> .....               | 211              | <i>caribbæus</i> .....                   | 23               |
| <i>Littorina galapagensis</i> .....     | 115              | <i>carminifer</i> .....                  | 198              |
| <i>Lobopoda galapagoensis</i> .....     | 203              | <i>convergens</i> .....                  | 198              |
| <i>Lophiomus caulinaris</i> .....       | 198              | <i>cuspidatus</i> .....                  | 198              |
| <i>spilurus</i> .....                   | 198              | <i>dorsalis</i> .....                    | 176              |
| <i>Lophopanopeus maculatus</i> .....    | 200              | <i>firmsquamis</i> .....                 | 176              |
| <i>Lophopteraster abyssorum</i> .....   | 157              | <i>fragilis</i> .....                    | 198              |
| <i>Lophozozymus frontalis</i> .....     | 118              | <i>gracillicauda</i> .....               | 198              |
| <i>Lopothrix frontalis</i> .....        | 148              | <i>latinasutus</i> .....                 | 198              |
| <i>Lucina æquizonata</i> .....          | 68               | <i>latirostratus</i> .....               | 198              |
| <i>townsendi</i> .....                  | 79               | <i>lepturus</i> .....                    | 176              |
| <i>Lucioblennius alepidotus</i> .....   | 72               | <i>leucophæus</i> .....                  | 198              |
| <i>Lunatia sandwichensis</i> .....      | 142              | <i>liolepis</i> .....                    | 72               |
| <i>Lychnopolis argenteolus</i> .....    | 198              | <i>liraticeps</i> .....                  | 198              |
| <i>Lycodapus extensus</i> .....         | 141              | <i>loricatus</i> .....                   | 198              |
| <i>fierasfer</i> .....                  | 72               | <i>magnus</i> .....                      | 176              |
| <i>parviceps</i> .....                  | 141              | <i>occa</i> .....                        | 28               |
| <i>Lycodes anguis</i> .....             | 198              | <i>orbitalis</i> .....                   | 198              |
| <i>brevipes</i> .....                   | 75               | <i>pectoralis</i> .....                  | 93               |
| <i>cicatrifer</i> .....                 | 198              | <i>scaphopsis</i> .....                  | 72               |
| <i>concolor</i> .....                   | 176              | <i>stelgidolepis</i> .....               | 72               |
| <i>diapterus</i> .....                  | 93               | <i>suborbitalis</i> .....                | 176              |
| <i>digitatus</i> .....                  | 176              | <i>tenuicauda</i> .....                  | 198              |
| <i>incisus</i> .....                    | 198              | <i>trichiurus</i> .....                  | 198              |
| <i>palearis</i> .....                   | 141              | <i>Maiopsis panamensis</i> .....         | 104              |
| <i>porifer</i> .....                    | 72               | <i>Malacocephalus occidentalis</i> ..... | 28               |
| <i>serpens</i> .....                    | 198              | <i>Malacocottus zonurus</i> .....        | 75               |
| <i>zoarchus</i> .....                   | 139              | <i>Malletia abyssorum</i> .....          | 189              |
| <i>Lycodopsis crassilabris</i> .....    | 72               | <i>acinula</i> .....                     | 63               |
| <i>crotalinus</i> .....                 | 72               | <i>æolata</i> .....                      | 63               |



|  | No. of<br>Title. |   | No. of<br>Title. |
|--|------------------|---|------------------|
| <i>Malletia agathida</i> .....           | 63               | <i>Mithrax bahamensis</i> .....           | 106              |
| <i>faba</i> .....                        | 174              | <i>braziliensis</i> .....                 | 106              |
| <i>gibbsii</i> .....                     | 174              | <i>hemphilli</i> .....                    | 106              |
| <i>goniura</i> .....                     | 63               | <i>pilosus</i> .....                      | 106              |
| <i>kennerlyi</i> .....                   | 174              | <i>sinensis</i> .....                     | 106              |
| <i>pacifica</i> .....                    | 174              | <i>Mitra nodocancellata</i> .....         | 68               |
| <i>polita</i> .....                      | 189              | <i>Mixonus caudalis</i> .....             | 198              |
| <i>virens</i> .....                      | 63               | <i>Mixtopagurus gilli</i> .....           | 227              |
| <i>Malthopsis erinacea</i> .....         | 198              | <i>Modiolaria seminuda</i> .....          | 174              |
| <i>mitriger</i> .....                    | 170              | <i>taylori</i> .....                      | 174              |
| <i>sparsa</i> .....                      | 198              | <i>Moebia</i> .....                       | 139              |
| <i>spinosa</i> .....                     | 198              | <i>Mohnia frielei</i> .....               | 95               |
| <i>spinulosa</i> .....                   | 198              | <i>Molleria quadra</i> .....              | 174              |
| <i>Mangilia ceroplasta</i> .....         | 19               | <i>Mölleropsis abyssicola</i> .....       | 196              |
| <i>ephamilla</i> .....                   | 16               | <i>Monolena atrimana</i> .....            | 29               |
| <i>eritima</i> .....                     | 19               | <i>dubiosa</i> .....                      | 198              |
| <i>glypta</i> .....                      | 16               | <i>maculipinna</i> .....                  | 198              |
| <i>oxytata</i> .....                     | 16               | <i>Monomeropus malispinosus</i> .....     | 198              |
| <i>psila</i> .....                       | 19               | <i>pseudonus</i> .....                    | 198              |
| <i>Marginaster austerus</i> .....        | 211              | <i>Monomitopus torvus</i> .....           | 198              |
| <i>Marginella borealis</i> .....         | 11               | <i>Monothea margaretta</i> .....          | 218              |
| <i>virginiana</i> .....                  | 18               | <i>Montacuta bideniata fragilis</i> ..... | 189              |
| <i>Martesia fragilis</i> .....           | 189              | <i>bidentata tenuis</i> .....             | 189              |
| <i>Maurolicus lucetius</i> .....         | 198              | <i>casta</i> .....                        | 189              |
| <i>oculatus</i> .....                    | 198              | <i>cuneata</i> .....                      | 189              |
| <i>Maynea brunnea</i> .....              | 75               | <i>floridana</i> .....                    | 195              |
| <i>bulbiceps</i> .....                   | 198              | <i>striatula</i> .....                    | 189              |
| <i>pusilla</i> .....                     | 75               | <i>triquetra</i> .....                    | 189              |
| <i>Medæus lobipes</i> .....              | 200              | <i>Moseleya</i> .....                     | 139              |
| <i>Mediaster agassizii</i> .....         | 211              | <i>Mugil setosus</i> .....                | 93               |
| <i>Megayoldia</i> .....                  | 177              | <i>thoburni</i> .....                     | 163, 171         |
| <i>Melamphaes cristiceps</i> .....       | 72               | <i>Mumiola tenuis</i> .....               | 174              |
| <i>frontosus</i> .....                   | 198              | <i>Munida gracilipes</i> .....            | 104              |
| <i>lugubris</i> .....                    | 72               | <i>obesa</i> .....                        | 104              |
| <i>maxillaris</i> .....                  | 198              | <i>propinqua</i> .....                    | 104              |
| <i>nigrofulvus</i> .....                 | 198              | <i>refulgens</i> .....                    | 104              |
| <i>Melania acutiflora</i> .....          | 68               | <i>Munidion princeps</i> .....            | 180              |
| <i>Melanostoma argyreum</i> .....        | 170              | <i>Munidopsis agassizii</i> .....         | 104              |
| <i>Melicertum proboscifer</i> .....      | 179              | <i>carinipes</i> .....                    | 104              |
| <i>Melichthys bispinosus</i> .....       | 72               | <i>crassa</i> .....                       | 20               |
| <i>Melospiza fasciata clementæ</i> ..... | 82               | <i>crinita</i> .....                      | 104              |
| <i>graminea</i> .....                    | 82               | <i>depressa</i> .....                     | 104              |
| <i>Menidia gilberti</i> .....            | 66               | <i>hamata</i> .....                       | 104              |
| <i>Menippe convexa</i> .....             | 118              | <i>hendersoniana</i> .....                | 104              |
| <i>Merluccius angustimanus</i> .....     | 198              | <i>hystrix</i> .....                      | 104              |
| <i>Meseres macdonaldi</i> .....          | 124              | <i>inermis</i> .....                      | 104              |
| <i>Mesonema bairdii</i> .....            | 30               | <i>margarita</i> .....                    | 104              |
| <i>Mesorhoa gilli</i> .....              | 118              | <i>ornata</i> .....                       | 104              |
| <i>Mesorhytis costatus</i> .....         | 63               | <i>quadrata</i> .....                     | 104              |
| <i>Mesothuria multipes</i> .....         | 124              | <i>scabra</i> .....                       | 104              |
| <i>Micriyoldia</i> .....                 | 177              | <i>sericea</i> .....                      | 104              |
| <i>Microdonophis erabo</i> .....         | 229a             | <i>similis</i> .....                      | 20               |
| <i>Microgobius cyclolepis</i> .....      | 72               | <i>tanneri</i> .....                      | 104              |
| <i>Microlepidium grandiceps</i> .....    | 198              | <i>vicina</i> .....                       | 104              |
| <i>Micropanope areolata</i> .....        | 200              | <i>villosa</i> .....                      | 104              |
| <i>nitida</i> .....                      | 200              | <i>Murænichthys aoki</i> .....            | 229              |
| <i>polita</i> .....                      | 118              | <i>hattæ</i> .....                        | 229a             |
| <i>truncatifrons</i> .....               | 188              | <i>owstoni</i> .....                      | 229a             |
| <i>Microphrys branchialis</i> .....      | 200              | <i>Murex leeanus</i> .....                | 63               |
| <i>Micropogon megalops</i> .....         | 72               | <i>Mursia hawaiiensis</i> .....           | 118              |
| <i>Microspathodon cinereus</i> .....     | 72               | <i>Mycteroperca pardalis</i> .....        | 93               |
| <i>Micrura cæca</i> .....                | 158              | <i>Myctophum aurolaternatum</i> .....     | 198              |
| <i>dorsalis</i> .....                    | 97               | <i>atratum</i> .....                      | 198              |
| <i>rubra</i> .....                       | 97               | <i>fibulatum</i> .....                    | 170              |
| <i>Miliolina angularis</i> .....         | 193              | <i>laternatum</i> .....                   | 198              |
| <i>Mimus gilvus rostratus</i> .....      | 21               | <i>luminosum</i> .....                    | 198              |

|   | No. of<br>Title. |   | No. of<br>Title. |
|---|------------------|---|------------------|
| <i>Myctophum mexicanum</i> .....            | 72               | <i>Notostomus fragilis</i> .....              | 104              |
| <i>nannochir</i> .....                      | 72               | <i>robustus</i> .....                         | 10               |
| <i>nitidulum</i> .....                      | 198              | <i>vescus</i> .....                           | 47               |
| <i>oculeum</i> .....                        | 198              | <i>westergreni</i> .....                      | 104              |
| <i>opalinum</i> .....                       | 139              | <i>Nucula callicredemna</i> .....             | 63               |
| <i>protoculus</i> .....                     | 72               | <i>carlottensis</i> .....                     | 174              |
| <i>regale</i> .....                         | 93               | <i>iphigenia</i> .....                        | 166              |
| <i>remiger</i> .....                        | 139              | <i>subovata</i> .....                         | 189              |
| <i>tenuiculum</i> .....                     | 198              | <i>trigona</i> .....                          | 18               |
| <i>Myiarchus platyrhynchus</i> .....        | 37               | <i>Nuditheca</i> .....                        | 218              |
| <i>Myonanthus ambiguus</i> .....            | 120              | <i>Nursia tuberculata</i> .....               | 118              |
| <i>Myonera pretiosa</i> .....               | 189              | <i>Obelia castellata</i> .....                | 122              |
| <i>Myoxocephalus mednius</i> .....          | 187              | <i>Oceanodroma socorroensis</i> .....         | 82               |
| <i>Myra subovata</i> .....                  | 118              | <i>townsendi</i> .....                        | 113              |
| <i>townsendi</i> .....                      | 118              | <i>Octopus carolinensis</i> .....             | 11               |
| <i>Myripristis clarionensis</i> .....       | 171              | <i>gracilis</i> .....                         | 11               |
| <i>Mysella aleutica</i> .....               | 195              | <i>Odontaster robustus</i> .....              | 211              |
| <i>barbadensis</i> .....                    | 195              | <i>setosus</i> .....                          | 211              |
| <i>limpida</i> .....                        | 195              | <i>Odontodactylus havanensis</i> .....        | 147              |
| <i>minuscule</i> .....                      | 195              | <i>Odontopyxis frenatus</i> .....             | 141              |
| <i>pedroana</i> .....                       | 195              | <i>leptorhynchus</i> .....                    | 141              |
| <i>percompressa</i> .....                   | 195              | <i>Odostomia disparilis</i> .....             | 11               |
| <i>Myxine acutifrons</i> .....              | 198              | <i>engonia</i> .....                          | 19               |
| <i>circifrons</i> .....                     | 198              | <i>engonia teres</i> .....                    | 19               |
| <i>garmani</i> .....                        | 226              | <i>tornata</i> .....                          | 11               |
| <i>tridentiger</i> .....                    | 198              | <i>Odignathus</i> .....                       | 146              |
| <i>Nannobranchium macdonaldi</i> .....      | 139              | <i>gilli</i> .....                            | 146              |
| <i>Narcetes pluriserialis</i> .....         | 198              | <i>Odiplex granulatus</i> .....               | 118              |
| <i>Nassa townsendi</i> .....                | 63               | <i>Oligocottus acuticeps</i> .....            | 141              |
| <i>Natrix compressicauda taeniata</i> ..... | 145              | <i>Oligoplites mundus</i> .....               | 163              |
| <i>fasciata pictiventris</i> .....          | 145              | <i>Omalaxis nobilis</i> .....                 | 18               |
| <i>Nauphanta albatrossi</i> .....           | 179              | <i>Onchidium lesliei</i> .....                | 115              |
| <i>Nauphantopsis diomedæ</i> .....          | 16, 30           | <i>Oncocephalus porrectus</i> .....           | 198              |
| <i>Nautiscus pribilovius</i> .....          | 163, 187         | <i>Oneirophanta affinis</i> .....             | 124              |
| <i>Navarchus ænigmaticus</i> .....          | 125              | <i>Onos rufus</i> .....                       | 1                |
| <i>Nesera costata</i> .....                 | 16               | <i>Ophiacantha aculeata</i> .....             | 17               |
| <i>gigantea</i> .....                       | 11               | <i>contigua</i> .....                         | 197              |
| <i>undata</i> .....                         | 11               | <i>costata</i> .....                          | 197              |
| <i>Nectocrangon crassa</i> .....            | 187              | <i>crassidens</i> .....                       | 17               |
| <i>Nectonemertes mirabilis</i> .....        | 97               | <i>enopla</i> .....                           | 17               |
| <i>Nematocarcinus agassizii</i> .....       | 104              | <i>fraterna</i> .....                         | 16, 41           |
| <i>Nematonurus cyclolepis</i> .....         | 141              | <i>gracilis</i> .....                         | 16, 41           |
| <i>Nemichthys fronto</i> .....              | 198              | <i>granulifera V</i> .....                    | 17               |
| <i>Neobythites gilli</i> .....              | 28               | <i>hirta</i> .....                            | 197              |
| <i>marginatus</i> .....                     | 29               | <i>inconspicua</i> .....                      | 197              |
| <i>stelliferoides</i> .....                 | 72               | <i>moniliformis</i> .....                     | 197              |
| <i>Neoconger vermiformis</i> .....          | 72               | ( <i>Ophiectodia</i> ) <i>pectinula</i> ..... | 212              |
| <i>Neomorphaster forcipatus</i> .....       | 156              | <i>pacifica</i> .....                         | 197              |
| <i>Neorhynchus mexicanus</i> .....          | 118              | <i>paucispina</i> .....                       | 197              |
| <i>Nephropsis occidentalis</i> .....        | 104              | <i>spinifera</i> .....                        | 197              |
| <i>Neptunus iridescens</i> .....            | 118              | <i>varispina</i> .....                        | 16, 41           |
| <i>Nesoccia</i> .....                       | 108              | <i>Ophiactis profundus</i> .....              | 197              |
| <i>Nesomimus macdonaldi</i> .....           | 57               | <i>Ophichthys asakusæ</i> .....               | 229a             |
| <i>personatus</i> .....                     | 57               | <i>evionthas</i> .....                        | 66               |
| <i>Nesotriccus ridgwayi</i> .....           | 152              | <i>rugifer</i> .....                          | 66               |
| <i>Nectonemertes</i> .....                  | 97               | <i>tsuchidæ</i> .....                         | 229a             |
| <i>Netuma insularum</i> .....               | 171              | <i>Ophichthys biserialis</i> .....            | 198              |
| <i>Nielcnella subovata</i> .....            | 177              | <i>notochir</i> .....                         | 72               |
| <i>Niso æglees</i> .....                    | 16               | <i>frontalis</i> .....                        | 198              |
| <i>Nitidella incerta</i> .....              | 115              | <i>Ophidium galeoides</i> .....               | 72               |
| <i>Notacanthus analis</i> .....             | 1                | <i>Ophiernus annectens</i> .....              | 197              |
| <i>spinosus</i> .....                       | 198              | <i>polyporus</i> .....                        | 197              |
| <i>Notophyllum americanum</i> .....         | 41               | <i>seminudus</i> .....                        | 197              |
| <i>Notoscopelus castaneus</i> .....         | 139              | <i>Ophiobyrsella</i> .....                    | 212              |
| <i>margaritiferus</i> .....                 | 139              | <i>Ophiochiton carinatus</i> .....            | 197              |
| <i>quercinus</i> .....                      | 139              | <i>Ophiochondrella</i> .....                  | 212              |

## 554 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

|   | No. of<br>Title. |   | No. of<br>Title. |
|---|------------------|---|------------------|
| <i>Ophiocten pacificum</i> .....          | 197              | <i>Panopeus angustifrons</i> .....          | 80               |
| <i>Ophioglycera gigantea</i> .....        | 41               | <i>areolatus</i> .....                      | 80               |
| <i>Ophioglypha abscisa</i> .....          | 197              | <i>bermudensis</i> .....                    | 80               |
| <i>divisa</i> .....                       | 197              | <i>dissimilis</i> .....                     | 80               |
| <i>grandis</i> .....                      | 156              | <i>hemphillii</i> .....                     | 80               |
| <i>nana</i> .....                         | 197              | <i>latus</i> .....                          | 104              |
| <i>obtecta</i> .....                      | 197              | <i>ovatus</i> .....                         | 80               |
| <i>plana</i> .....                        | 197              | <i>tanneri</i> .....                        | 104              |
| <i>saurura</i> .....                      | 156              | <i>Pantomorus galapagoensis</i> .....       | 203              |
| <i>scutellata</i> .....                   | 197              | <i>Paracrangon areolata</i> .....           | 104              |
| <i>superba</i> .....                      | 197              | <i>Paractis vinosa</i> .....                | 120              |
| <i>tessellata</i> .....                   | 156              | <i>Parargeia ornata</i> .....               | 180              |
| <i>tumulosa</i> .....                     | 197              | <i>Paralichthys isoceles</i> .....          | 76               |
| <i>Ophiomitra granifera</i> .....         | 197              | <i>woolmani</i> .....                       | 171              |
| <i>lævis</i> .....                        | 197              | <i>Paraliparis angustifrons</i> .....       | 198              |
| <i>partita</i> .....                      | 197              | <i>attenuatus</i> .....                     | 198              |
| <i>spinea</i> V .....                     | 17               | <i>cephalus</i> .....                       | 93               |
| <i>Ophiomusium diomedea</i> .....         | 197              | <i>copei</i> .....                          | 139              |
| <i>glabrum</i> .....                      | 197              | <i>grandiceps</i> .....                     | 198              |
| <i>variabile</i> .....                    | 197              | <i>holomelas</i> .....                      | 141              |
| <i>Ophiomyxa panamensis</i> .....         | 197              | <i>latifrons</i> .....                      | 198              |
| <i>Ophionereis nuda</i> .....             | 197              | <i>mento</i> .....                          | 93               |
| <i>Ophioscion strabo</i> .....            | 171              | <i>rosaceus</i> .....                       | 72               |
| <i>Ophioscolex fragilis</i> .....         | 212              | <i>ulochir</i> .....                        | 141              |
| <i>Ophiothrix galapagensis</i> .....      | 197              | <i>Paralomis aspera</i> .....               | 104              |
| <i>Ophiozona alba</i> .....               | 197              | <i>longipes</i> .....                       | 104              |
| <i>contigua</i> .....                     | 197              | <i>Parapasiphaë compta</i> .....            | 10               |
| <i>Ophisoma macrurum</i> .....            | 92               | <i>cristata</i> .....                       | 10               |
| <i>nitens</i> .....                       | 66               | <i>sulcatifrons</i> .....                   | 10               |
| <i>prorigerum</i> .....                   | 92               | <i>Parapenæus goodei</i> .....              | 39               |
| <i>Opisthopus transversus</i> .....       | 118              | <i>megalops</i> .....                       | 39               |
| <i>Opisthotenthis agassizii</i> .....     | 168              | <i>Paricelinus thoburni</i> .....           | 141              |
| <i>Optonurus atherodon</i> .....          | 170              | <i>Pasiphaë princeps</i> .....              | 10               |
| <i>Oractis diomedea</i> .....             | 120              | <i>Pasiphaë cristata americana</i> .....    | 104              |
| <i>Orthopristsis forbesi</i> .....        | 171              | <i>magna</i> .....                          | 104              |
| <i>Orthoyoldia</i> .....                  | 177              | <i>Peachia koreni</i> .....                 | 120              |
| <i>Osachila lata</i> .....                | 104              | <i>Pecchiolia granulifera</i> .....         | 18               |
| <i>levis</i> .....                        | 200              | <i>Pecten leptaleus</i> .....               | 11               |
| <i>Osmerus albatrossis</i> .....          | 163, 187         | <i>undatus</i> .....                        | 18               |
| <i>Otakia rasborina</i> .....             | 224              | <i>Pectiniunguis americanus</i> .....       | 67               |
| <i>Othonia carolinensis</i> .....         | 106              | <i>Pectunculus arcodentius</i> .....        | 142              |
| <i>nicholsi</i> .....                     | 106              | <i>Pedonœces bauri</i> .....                | 203              |
| <i>rotunda</i> .....                      | 106              | <i>Pelagodroma marina</i> .....             | 23               |
| <i>Otocoris alpestris insularis</i> ..... | 82               | <i>Pelagothuria natatrix</i> .....          | 124              |
| <i>pallida</i> .....                      | 82               | <i>Pelecanichthys crumenalis</i> .....      | 170              |
| <i>Otophidium indefatigable</i> .....     | 66               | <i>Peltaster hebes</i> .....                | 211              |
| <i>Oulactis californica</i> .....         | 120              | <i>Peneopsis diomedea</i> .....             | 104              |
| <i>Ovalipes</i> .....                     | 200              | <i>Peneroplis pertusus discoideus</i> ..... | 193              |
| <i>Oxacis galapagoensis</i> .....         | 203              | <i>Peneus balboæ</i> .....                  | 104              |
| <i>Oxycottus</i> .....                    | 163              | <i>Peniagone intermedia</i> .....           | 124              |
| <i>Pachycheles panamensis</i> .....       | 104              | <i>Pennatula alata</i> .....                | 121              |
| <i>Pachygrapsus longipes</i> .....        | 118              | <i>distorta pacifica</i> .....              | 121              |
| <i>Pælopatides suspecta</i> .....         | 124              | <i>keelikeri</i> .....                      | 121              |
| <i>Paguristes fecundus</i> .....          | 104              | <i>Penopus macdonaldi</i> .....             | 139              |
| <i>Pagurus bernhardus</i> .....           | 220              | <i>Pentacheles debilis</i> .....            | 10               |
| <i>Palicus alternatus</i> .....           | 182              | <i>nanus</i> .....                          | 10               |
| <i>angustus</i> .....                     | 182              | <i>Pentagonaster eximius</i> .....          | 156              |
| <i>bahamensis</i> .....                   | 182              | <i>planus</i> .....                         | 157              |
| <i>depressus</i> .....                    | 182              | <i>simplex</i> .....                        | 157              |
| <i>faxoni</i> .....                       | 182              | <i>Periaster tenuis</i> .....               | 133              |
| <i>isthmus</i> .....                      | 182              | <i>Periceridæ</i> .....                     | 106              |
| <i>lucasii</i> .....                      | 200              | <i>Pericera atlantica</i> .....             | 106              |
| <i>Pallenopsis californica</i> .....      | 109              | <i>contigua</i> .....                       | 106              |
| <i>Palometa</i> .....                     | 163              | <i>triangulata</i> .....                    | 106              |
| <i>Paludicola frenata</i> .....           | 62               | <i>Periphylla humilis</i> .....             | 30               |
| <i>Pandora carolinensis</i> .....         | 19               | <i>Periploma affinis</i> .....              | 180              |

|  | No. of<br>Title. |                                       | No. of<br>Title. |
|--|------------------|---------------------------------------|------------------|
| <i>Periploma carpenteri</i> .....      | 166              | <i>Pleurotomella bruneri</i> .....    | 11               |
| <i>discus</i> .....                    | 68               | <i>castanea</i> .....                 | 166              |
| <i>stearnsii</i> .....                 | 166              | <i>catharinæ</i> .....                | 11               |
| <i>undulata</i> .....                  | 18               | <i>cingulata</i> .....                | 63               |
| <i>Peristedion gracile</i> .....       | 139              | <i>climacella</i> .....               | 142              |
| <i>hians</i> .....                     | 170              | <i>diomedææ</i> .....                 | 11               |
| <i>Peristedium barbiger</i> .....      | 198              | <i>emertoni</i> .....                 | 11               |
| <i>crustosum</i> .....                 | 198              | <i>frielei</i> .....                  | 18               |
| <i>longispatha</i> .....               | 29               | <i>gypsina</i> .....                  | 142              |
| <i>platycephalum</i> .....             | 29               | <i>hawaiiiana</i> .....               | 142              |
| <i>Perissias</i> .....                 | 163              | <i>jeffreysii</i> .....               | 18               |
| <i>Petalophthalmus pacificus</i> ..... | 104              | <i>lottæ</i> .....                    | 18               |
| <i>Petrolisthes agassizii</i> .....    | 104              | <i>saffordi</i> .....                 | 11               |
| <i>Petromyzon bairdii</i> .....        | 1                | <i>sandersoni</i> .....               | 11               |
| <i>Phacoides amiantus</i> .....        | 228a             | <i>suffusa</i> .....                  | 63               |
| <i>approximatus</i> .....              | 228a             | <i>tincta</i> .....                   | 18               |
| <i>bermudensis</i> .....               | 228a             | <i>vitrea</i> .....                   | 18               |
| <i>crenella</i> .....                  | 228a             | <i>Plexechinus cinctus</i> .....      | 183              |
| <i>heroicus</i> .....                  | 228a             | <i>Plumularia alternata</i> .....     | 218              |
| <i>lamprus</i> .....                   | 228a             | <i>altithecæ</i> .....                | 218              |
| <i>Philobrya atlantica</i> .....       | 166              | <i>corrugata</i> .....                | 218              |
| <i>Philoscia richmondi</i> .....       | 223              | <i>dendritica</i> .....               | 218              |
| <i>Phormosoma hispidum</i> .....       | 183              | <i>floridana</i> .....                | 218              |
| <i>panamensis</i> .....                | 183              | <i>goodei</i> .....                   | 218              |
| <i>Phos cocosensis</i> .....           | 166              | <i>inermis</i> .....                  | 218              |
| <i>Photonectes gracilis</i> .....      | 139              | <i>paucinoda</i> .....                | 218              |
| <i>Phrissocystis aculeata</i> .....    | 183              | <i>profunda</i> .....                 | 218              |
| <i>Phucocœtes suspectus</i> .....      | 198              | <i>virginiaæ</i> .....                | 218              |
| <i>Phycis cirratus</i> .....           | 139              | <i>Podochela lobifrons</i> .....      | 118              |
| <i>Phyllites arctica</i> .....         | 129              | <i>mexicana</i> .....                 | 118              |
| <i>Phyllocladylus leei</i> .....       | 62               | <i>spinifrons</i> .....               | 154              |
| <i>Phyllophorus aculeatus</i> .....    | 124              | <i>tenuipes</i> .....                 | 118              |
| <i>Physiculus longipes</i> .....       | 198              | <i>Podothecus hamlini</i> .....       | 163, 187         |
| <i>nematophus</i> .....                | 72               | <i>thompsoni</i> .....                | 163, 187         |
| <i>rastrelliger</i> .....              | 72, 198          | <i>Pœcilonetta galapagensis</i> ..... | 57               |
| <i>Pilodius flavus</i> .....           | 118              | <i>Polycanna americana</i> .....      | 30               |
| <i>Pilumnoplax americanus</i> .....    | 188              | <i>Polychæles granulatus</i> .....    | 104              |
| <i>Pilumnus andrewsi</i> .....         | 188              | <i>sculptus pacificus</i> .....       | 104              |
| <i>diomedææ</i> .....                  | 153              | <i>tanneri</i> .....                  | 104              |
| <i>gonzalensis</i> .....               | 118              | <i>Polycirrhus rathbuni</i> .....     | 66               |
| <i>holosericus</i> .....               | 188              | <i>Polyclinum globosum</i> .....      | 187              |
| <i>spinosissimus</i> .....             | 188              | <i>pannosum</i> .....                 | 187              |
| <i>spinulifer</i> .....                | 200              | <i>Polydora tubifex</i> .....         | 41               |
| <i>Pinnixa affinis</i> .....           | 200              | <i>Polyipnus laternatus</i> .....     | 198              |
| <i>brevipollex</i> .....               | 200              | <i>Polynoë aurantiaca</i> .....       | 41               |
| <i>californiensis</i> .....            | 118              | <i>Polypiumularia armata</i> .....    | 218              |
| <i>occidentalis</i> .....              | 118              | <i>Pomacentrus leucurus</i> .....     | 93               |
| <i>panamensis</i> .....                | 140              | <i>Pontella agassizii</i> .....       | 148              |
| <i>Pisoodonophis cruentifer</i> .....  | 139              | <i>Pontinus furcirhinus</i> .....     | 198              |
| <i>zophistius</i> .....                | 229a             | <i>longispinis</i> .....              | 139              |
| <i>Planktonemertes agassizii</i> ..... | 206              | <i>macrolepis</i> .....               | 139              |
| <i>Planoceropsis</i> .....             | 98               | <i>rathbuni</i> .....                 | 139              |
| <i>Platophrys tæniopterus</i> .....    | 72               | <i>Pontophilus abyssi</i> .....       | 10               |
| <i>Platymera californiensis</i> .....  | 118              | <i>occidentalis</i> .....             | 104              |
| <i>Plectobranthus evides</i> .....     | 72               | <i>Porania insignis</i> .....         | 157              |
| <i>Plectromus crassiceps</i> .....     | 26               | <i>Porichthys nautopædium</i> .....   | 66               |
| <i>suborbitalis</i> .....              | 1                | <i>Porocidaris cobosi</i> .....       | 183              |
| <i>Pleurobranchus americanus</i> ..... | 18               | <i>milleri</i> .....                  | 183              |
| <i>Pleurophysa insignis</i> .....      | 55               | <i>Poroclinus rothrocki</i> .....     | 75               |
| <i>Pleurotoma aulaca</i> .....         | 166              | <i>Porogadus atripectus</i> .....     | 198              |
| <i>exulans</i> .....                   | 63               | <i>breviceps</i> .....                | 198              |
| <i>microscelida</i> .....              | 142              | <i>longiceps</i> .....                | 198              |
| <i>Pleurotomella agonia</i> .....      | 63               | <i>miles</i> .....                    | 28               |
| <i>argeta</i> .....                    | 63               | <i>promelas</i> .....                 | 93               |
| <i>bairdii</i> .....                   | 11               | <i>Poromya cymata</i> .....           | 63               |
| <i>benedicti</i> .....                 | 11               | <i>microdonta</i> .....               | 63               |

|   | No. of<br>Title. |  | No. of<br>Title. |
|---|------------------|--|------------------|
| <i>Poromya sublevis</i> .....                 | 11               | <i>Raia trachura</i> .....             | 93               |
| <i>Portunus angustus</i> .....                | 200              | <i>Raja abyssicola</i> .....           | 141              |
| <i>minimus</i> .....                          | 200              | <i>aleutica</i> .....                  | 141              |
| <i>Pourtalesia tanneri</i> .....              | 183              | <i>badia</i> .....                     | 198              |
| <i>Priacanthus serrula</i> .....              | 73               | <i>equatorialis</i> .....              | 66               |
| <i>Prionaster elegans</i> .....               | 211              | <i>Ramularia</i> .....                 | 163              |
| <i>Prionodes stilbostigma</i> .....           | 66               | <i>Ramulina proteiformis</i> .....     | 193              |
| <i>Prionotus albirostris</i> .....            | 66               | <i>Randallia agaricias</i> .....       | 200              |
| <i>beanii</i> .....                           | 139              | <i>bulligera</i> .....                 | 200              |
| <i>egretta</i> .....                          | 139              | <i>distincta</i> .....                 | 118              |
| <i>frontalis</i> .....                        | 198              | <i>Raninops fornicata</i> .....        | 104              |
| <i>gymnostethus</i> .....                     | 93               | <i>Raphactis nitida</i> .....          | 210              |
| <i>loxias</i> .....                           | 171              | <i>Reophax armatus</i> .....           | 167              |
| <i>militaris</i> .....                        | 139              | <i>bilocularis</i> .....               | 193              |
| <i>quiescens</i> .....                        | 66               | <i>diffugiformis testacea</i> .....    | 193              |
| <i>xenisma</i> .....                          | 66               | <i>insectus</i> .....                  | 167              |
| <i>Pristopus verrilli</i> .....               | 146              | <i>turbo</i> .....                     | 167              |
| <i>Prognurus cypselurus</i> .....             | 163, 187         | <i>Rhabdocalyptus asper</i> .....      | 232              |
| <i>Promyllantor alcocki</i> .....             | 170              | <i>mirabilis</i> .....                 | 232              |
| <i>Pronotogrammus eos</i> .....               | 72               | <i>nodulosus</i> .....                 | 232              |
| <i>Propilidium elegans</i> .....              | 11               | <i>tener</i> .....                     | 232              |
| <i>Prostheceraeus panamensis</i> .....        | 123              | <i>Rhegaster abyssicola</i> .....      | 157              |
| <i>Protoparce calapagensis</i> .....          | 67               | <i>Rhinoliparis barbifer</i> .....     | 141              |
| <i>Protula alba</i> .....                     | 43               | <i>Rhinolithodes cristatipes</i> ..... | 104              |
| <i>diomedææ</i> .....                         | 43               | <i>Rhizophysa uvaria</i> .....         | 30               |
| <i>Psammobatis rutrum</i> .....               | 76               | <i>Rhombiscus</i> .....                | 224              |
| <i>Psammogorgia variabilis</i> .....          | 121              | <i>Rhus frigida</i> .....              | 129              |
| <i>Psammosphæra fusca testacea</i> .....      | 193              | <i>Rimula expansa</i> .....            | 166              |
| <i>Pseudarchaster concinnus</i> .....         | 156              | <i>Rissoina newcombei</i> .....        | 174              |
| <i>granuliferus</i> .....                     | 211              | <i>Rocinela laticauda</i> .....        | 180              |
| (?) <i>hispidus</i> .....                     | 211              | <i>modesta</i> .....                   | 180              |
| <i>ordinatus</i> .....                        | 211              | <i>Rondeletia bicolor</i> .....        | 136, 139         |
| <i>Pseudione galacanthæ</i> .....             | 180              | <i>Rotella cryptospira</i> .....       | 11               |
| <i>Pseudojulis adustus</i> .....              | 72               | <i>Rumula azalea</i> .....             | 66               |
| <i>inornatus</i> .....                        | 72               | <i>Rupornis gracilis</i> .....         | 36               |
| <i>melanotis</i> .....                        | 72               | <i>magnirostris gracilis</i> .....     | 37               |
| <i>Pseudonotus acutus</i> .....               | 198              | <i>Sabatia pustulosa</i> .....         | 142              |
| <i>Pseudorotella minuscula</i> .....          | 196              | <i>Sabella picta</i> .....             | 41               |
| <i>Pseudoryctes</i> .....                     | 203              | <i>Saccamina consociata</i> .....      | 193              |
| <i>Pseudosquilla megalopthalma</i> .....      | 147              | <i>Sagartia lactea</i> .....           | 120              |
| <i>Pseudolithus mitsukurii</i> .....          | 224              | <i>paradoxa</i> .....                  | 120              |
| <i>Psolidium gracile</i> .....                | 124              | <i>sancti-matthæi</i> .....            | 120              |
| <i>panamense</i> .....                        | 124              | <i>Salenia miliaris</i> .....          | 183              |
| <i>Psolus digitatus</i> .....                 | 124              | <i>Salix minuta</i> .....              | 129              |
| <i>diomedææ</i> .....                         | 124              | <i>Scala pompholyx</i> .....           | 63               |
| <i>pauper</i> .....                           | 124              | <i>Scalaria leptalea</i> .....         | 19               |
| <i>Psychrolutes zebra</i> .....               | 75               | <i>teres</i> .....                     | 19               |
| <i>Psychropotes dubiosa</i> .....             | 124              | <i>Scaphander alatus</i> .....         | 142              |
| <i>raripe</i> .....                           | 124              | <i>interruptus</i> .....               | 63               |
| <i>Pteraster hexactis</i> .....               | 156              | <i>nobilis</i> .....                   | 11               |
| <i>Pterophysa grandis</i> .....               | 16, 30           | <i>Scaphella benthalis</i> .....       | 166              |
| <i>Puffinus auricularis</i> .....             | 82               | <i>Scarites galapagoensis</i> .....    | 203              |
| <i>Pugettia dalli</i> .....                   | 118              | <i>Scarus cuzamilæ</i> .....           | 60               |
| <i>Puncturella abyssicola</i> .....           | 18               | <i>Schizaster latifrons</i> .....      | 183              |
| ( <i>Fissurisepta</i> ) <i>eritmeta</i> ..... | 11               | <i>townsendi</i> .....                 | 183              |
| <i>Pycnanthus maliformis</i> .....            | 120              | <i>Schizotricha dichotoma</i> .....    | 218              |
| <i>Pylocheles partitus</i> .....              | 227              | <i>parvula</i> .....                   | 218              |
| <i>Pylopagurus affinis</i> .....              | 104              | <i>Sciadonus pedicellaris</i> .....    | 198              |
| <i>hirtimanus</i> .....                       | 104              | <i>Sclerocrangon atrox</i> .....       | 104              |
| <i>longimanus</i> .....                       | 104              | <i>procax</i> .....                    | 104              |
| <i>Pyrenaster</i> .....                       | 211              | <i>Scleroplax granulatus</i> .....     | 118              |
| <i>Radulinus asprellus</i> .....              | 72               | <i>Scolecithrix cristata</i> .....     | 148              |
| <i>boleoides</i> .....                        | 163, 204         | <i>persecans</i> .....                 | 148              |
| <i>Raia interrupta</i> .....                  | 176              | <i>Scolopendra galapagoensis</i> ..... | 67               |
| <i>obtusa</i> .....                           | 176              | <i>macracanthus</i> .....              | 67               |
| <i>rosispinis</i> .....                       | 176              | <i>microcanthus</i> .....              | 67               |

|  | No. of<br>Title. |  | No. of<br>Title. |
|--|------------------|--|------------------|
| <i>Scolophthalmus lucifugus</i> .....    | 104              | <i>Solen mexicanus</i> .....             | 216              |
| <i>Scopelengys dispar</i> .....          | 198              | <i>Solenocera agassizii</i> .....        | 104              |
| <i>Scorpena agassizii</i> .....          | 139              | <i>Solenolambrus decemspinosus</i> ..... | 153              |
| <i>cristulata</i> .....                  | 139              | <i>Solmaris incisa</i> .....             | 30               |
| <i>onaria</i> .....                      | 224              | <i>Spatagodesma</i> .....                | 183              |
| <i>pannosa</i> .....                     | 171              | <i>Spelæophorus elevatus</i> .....       | 188              |
| <i>remigera</i> .....                    | 170              | <i>Speocarcinus granulimanus</i> .....   | 118              |
| <i>russula</i> .....                     | 66               | <i>Speotyto rostrata</i> .....           | 82               |
| <i>sierra</i> .....                      | 72               | <i>Spergo daphnelloides</i> .....        | 142              |
| <i>Scotoanassa gracilis</i> .....        | 124              | <i>glandiniformis</i> .....              | 142              |
| <i>Scotodeima setigerum</i> .....        | 124              | <i>Sphæroma octoneum</i> .....           | 202              |
| <i>Scylliorhinus profundorum</i> .....   | 139              | <i>rhomburum</i> .....                   | 202              |
| <i>Sebastichthys alutus</i> .....        | 72               | <i>yucatanum</i> .....                   | 223              |
| <i>aurora</i> .....                      | 72               | <i>Sphæroniscus portoricensis</i> .....  | 223              |
| <i>diploproa</i> .....                   | 72               | <i>Sphærothuria bitentaculata</i> .....  | 124              |
| <i>goodei</i> .....                      | 72               | <i>Sphagebranchus moseri</i> .....       | 229a             |
| <i>introniger</i> .....                  | 72               | <i>Sphenocarcinus agassizi</i> .....     | 118              |
| <i>rupestris</i> .....                   | 72               | <i>Spindalis benedicti</i> .....         | 37               |
| <i>saxicola</i> .....                    | 72               | <i>zena townsendi</i> .....              | 51               |
| <i>sinensis</i> .....                    | 72               | <i>Spinivomer goodei</i> .....           | 2                |
| <i>zacentrus</i> .....                   | 72               | <i>Spirobolus sanctæ-luciæ</i> .....     | 67               |
| <i>Sebastinae</i> .....                  | 128              | <i>Spirontocaris avina</i> .....         | 187              |
| <i>Sebastodes aleutianus</i> .....       | 163, 187         | <i>barbata</i> .....                     | 187              |
| <i>ayresii</i> .....                     | 171              | <i>Spiropagurus occidentalis</i> .....   | 104              |
| <i>crameri</i> .....                     | 171              | <i>Spirotropis ephamilla</i> .....       | 11               |
| <i>hakodatis</i> .....                   | 224              | <i>Sportella californica</i> .....       | 195              |
| <i>scythropus</i> .....                  | 224              | <i>pilsbryi</i> .....                    | 195              |
| <i>semicinctus</i> .....                 | 171              | <i>stearnsii</i> .....                   | 195              |
| <i>Sebastolobus alascanus</i> .....      | 75               | <i>Squilla aculeata</i> .....            | 147              |
| <i>altivelis</i> .....                   | 141              | <i>alba</i> .....                        | 147              |
| <i>Seguenzia eritima</i> .....           | 11               | <i>biformis</i> .....                    | 147              |
| <i>formosa nitida</i> .....              | 11               | <i>intermedia</i> .....                  | 147              |
| <i>Seminatrix pygæus</i> .....           | 145              | <i>mantoidea</i> .....                   | 147              |
| <i>Sergestes halia</i> .....             | 104              | <i>panamensis</i> .....                  | 147              |
| <i>inous</i> .....                       | 104              | <i>parva</i> .....                       | 147              |
| <i>mollis</i> .....                      | 10               | <i>polita</i> .....                      | 147              |
| <i>phorcus</i> .....                     | 104              | <i>quadridens</i> .....                  | 147              |
| <i>Serranus æquidens</i> .....           | 72               | <i>rugosa</i> .....                      | 147              |
| <i>Serrivomer beanii</i> .....           | 2                | <i>Stachyodes ambigua</i> .....          | 121              |
| <i>sector</i> .....                      | 198              | <i>Stachyptilum superbum</i> .....       | 121              |
| <i>Sertularia variabilis</i> .....       | 122              | <i>Staurocalyptus fasciculatus</i> ..... | 232              |
| <i>Sicyonia affinis</i> .....            | 104              | <i>solidus</i> .....                     | 232              |
| <i>picta</i> .....                       | 104              | <i>Steindachneria argentea</i> .....     | 139              |
| <i>Sideriaster grandis</i> .....         | 211              | <i>Stelgistrum steinegeri</i> .....      | 187              |
| <i>Sigmops stigmaticus</i> .....         | 1                | <i>stejnegeri</i> .....                  | 163              |
| <i>Sigsbela lineata</i> .....            | 197              | <i>Stenella ramosa</i> .....             | 121              |
| <i>Sipho cœlatus hebes</i> .....         | 11               | <i>Stephanactis hyalonematis</i> .....   | 120              |
| ( <i>Mohnia</i> ) <i>cœlatulus</i> ..... | 11               | <i>Stephanoberyx gillii</i> .....        | 139              |
| <i>simplex</i> .....                     | 11               | <i>monæ</i> .....                        | 1                |
| <i>hispidulus</i> .....                  | 11               | <i>Sternias</i> .....                    | 163              |
| <i>leptaleus</i> .....                   | 11               | <i>Sternoptyx obscura</i> .....          | 198              |
| <i>obesus</i> .....                      | 11               | <i>Stolephorus cultratus</i> .....       | 93               |
| <i>profundicola</i> .....                | 11               | <i>Stomias atriventer</i> .....          | 198              |
| <i>profundicola dispar</i> .....         | 11               | <i>colubrinus</i> .....                  | 198              |
| <i>Siphostoma carinatum</i> .....        | 93               | <i>hexagonatus</i> .....                 | 198              |
| <i>Skenea trilix</i> .....               | 19               | <i>Stomion bauri</i> .....               | 203              |
| <i>Solariella actinophora</i> .....      | 63               | <i>carinipenne</i> .....                 | 203              |
| <i>ceratophora</i> .....                 | 166              | <i>piceum</i> .....                      | 203              |
| <i>nuda</i> .....                        | 166              | <i>Stromateus palometa</i> .....         | 66               |
| <i>oxybasis</i> .....                    | 63               | <i>Styela greeleyi</i> .....             | 187              |
| <i>reticulina</i> .....                  | 142              | <i>Stylochoplana californica</i> .....   | 123              |
| <i>Solaster abyssicola V</i> .....       | 17               | <i>Stylochus crassus</i> .....           | 98               |
| <i>benedicti</i> .....                   | 156              | <i>frontalis</i> .....                   | 98               |
| <i>syrtensis</i> .....                   | 156              | <i>Strombella fragilis</i> .....         | 95               |
| <i>Solemya grandis</i> .....             | 189              | <i>melonis</i> .....                     | 95               |
| <i>johnsoni</i> .....                    | 95               | <i>middendorffii</i> .....               | 95               |



|   | No. of<br>Title. |  | No. of<br>Title. |
|---|------------------|--|------------------|
| <i>Stomatoca divisa</i> .....                   | 179              | <i>Thalassoma socorroense</i> .....          | 72               |
| <i>Syllis spongiphila</i> .....                 | 41               | <i>virens</i> .....                          | 72               |
| <i>Symphurus atramentatus</i> .....             | 66               | <i>Thecocarpus benedicti</i> .....           | 218              |
| <i>fasciolaris</i> .....                        | 93               | <i>normani</i> .....                         | 218              |
| <i>leei</i> .....                               | 66               | <i>Therobromus callorhini</i> .....          | 187              |
| <i>microlepis</i> .....                         | 198              | <i>Thordisa dubia</i> .....                  | 125              |
| <i>varius</i> .....                             | 198              | <i>Thracia nitida</i> .....                  | 11               |
| <i>Synallactes enigma</i> .....                 | 124              | <i>Thurammina cariosa</i> .....              | 193              |
| <i>alexandri</i> .....                          | 124              | <i>erinacea</i> .....                        | 167              |
| <i>Synaphobranchus iraconis</i> .....           | 229a             | <i>favosa</i> .....                          | 193              |
| <i>jenkinsi</i> .....                           | 229a             | <i>Thyasira excavata</i> .....               | 228a             |
| <i>Synapta brychia</i> .....                    | 16, 41           | <i>magellanica</i> .....                     | 228a             |
| <i>Synchirus gilli</i> .....                    | 61               | <i>tomeana</i> .....                         | 228a             |
| <i>Synidotea angulata</i> .....                 | 172              | <i>Thymele</i> .....                         | 67               |
| <i>erosa</i> .....                              | 172              | <i>Thyrolambrus astroides</i> .....          | 153              |
| <i>lævis</i> .....                              | 172              | <i>erosus</i> .....                          | 200              |
| <i>laticauda</i> .....                          | 172              | <i>Thysanopoda agassizi</i> .....            | 130              |
| <i>nebulosa</i> .....                           | 172              | <i>Timogenes niger</i> .....                 | 67               |
| <i>pallida</i> .....                            | 172              | <i>Tindaria callistiformis</i> .....         | 177              |
| <i>picta</i> .....                              | 172              | <i>lata</i> .....                            | 189              |
| <i>Synodus acutus</i> .....                     | 198              | <i>Tindariopsis</i> .....                    | 177              |
| <i>evermanni</i> .....                          | 66               | <i>Tosia (Plinthaster) compta</i> .....      | 211              |
| <i>jenkinsi</i> .....                           | 66               | <i>nitida</i> .....                          | 211              |
| <i>lacertinus</i> .....                         | 72               | <i>Toxobrissus pacificus</i> .....           | 183              |
| <i>simulans</i> .....                           | 198              | <i>Trachichthys mento</i> .....              | 198              |
| <i>Synoicum irregulare</i> .....                | 187              | <i>Trachonurus sentipellis</i> .....         | 170              |
| <i>Synuropus granulatus</i> .....               | 223              | <i>Trachycarcinus corallinus</i> .....       | 104              |
| <i>Tachysurus liropus</i> .....                 | 171              | <i>spinulifer</i> .....                      | 188              |
| <i>Tagelus poeyi</i> .....                      | 216              | <i>Trachyrhynchus helolepis</i> .....        | 93               |
| <i>Tanais alascensis</i> .....                  | 202              | <i>Tractolira sparta</i> .....               | 166              |
| <i>Taranis morchii tornatus</i> .....           | 11               | <i>Trichiurus nitens</i> .....               | 198              |
| <i>Tecticeps alascensis</i> .....               | 173              | <i>Tridachia diomedeæ</i> .....              | 125              |
| <i>convexus</i> .....                           | 202              | <i>Trifissus ioturus</i> .....               | 224              |
| <i>Teleoteuthis (Onychia) agilis</i> .....      | 18               | <i>Triglops beani</i> .....                  | 141              |
| <i>Tellina americana</i> .....                  | 221              | <i>scepticus</i> .....                       | 141              |
| <i>amianta</i> .....                            | 221              | <i>xenostethus</i> .....                     | 141              |
| <i>cerrosiana</i> .....                         | 221              | <i>Trigonoporus dendriticus</i> .....        | 98               |
| <i>colorata</i> .....                           | 221              | <i>Tritonia diomedeæ</i> .....               | 125              |
| <i>flagellum</i> .....                          | 221              | <i>exsulans</i> .....                        | 125              |
| <i>georgiana</i> .....                          | 221              | <i>Trochostoma granulatum</i> .....          | 124              |
| <i>iheringi</i> .....                           | 221              | <i>intermedium</i> .....                     | 124              |
| <i>leucogonia</i> .....                         | 221              | <i>Troglodytes beani</i> .....               | 37               |
| <i>macneillii</i> .....                         | 221              | <i>tanneri</i> .....                         | 82               |
| <i>meropsis</i> .....                           | 221              | <i>Trophon abyssorum</i> .....               | 18               |
| <i>pacifica</i> .....                           | 221              | <i>limicola</i> .....                        | 18               |
| <i>panamensis</i> .....                         | 221              | <i>cerosensis</i> .....                      | 95               |
| <i>paziana</i> .....                            | 221              | <i>disparilis</i> .....                      | 95               |
| <i>pristiphora</i> .....                        | 221              | <i>scitulus</i> .....                        | 95               |
| <i>promera</i> .....                            | 221              | <i>Tropidurus lemniscatus</i> .....          | 62               |
| <i>reclusa</i> .....                            | 221              | <i>Turbonilla grandis</i> .....              | 18               |
| <i>recurva</i> .....                            | 221              | <i>perlepada</i> .....                       | 18               |
| <i>santarosæ</i> .....                          | 221              | <i>Turricula macdonaldi</i> .....            | 63               |
| <i>suffusa</i> .....                            | 221              | <i>Typhlomangelia tanneri</i> .....          | 11               |
| <i>texana</i> .....                             | 221              | <i>Typhlopsaras shufeldti</i> .....          | 3                |
| <i>Telmessus</i> .....                          | 100              | <i>Ulvicola sanctæ-rosæ</i> .....            | 171              |
| <i>Terebratalia obsoleta</i> .....              | 103              | <i>Umbellula geniculata</i> .....            | 121              |
| <i>Terebratella occidentalis obsoleta</i> ..... | 95               | <i>Upeneus xanthogrammus</i> .....           | 93               |
| <i>Tetrastemma dorsale unicolor</i> .....       | 97               | <i>Upocerthia propinqua</i> .....            | 53               |
| <i>roseum</i> .....                             | 97               | <i>Urechinus giganteus</i> .....             | 183              |
| <i>vermiculus catenulatum</i> .....             | 97               | <i>Uroconger varidens</i> .....              | 198              |
| <i>Tetraxanthus</i> .....                       | 188              | <i>Uropterygius okinawæ</i> .....            | 229a             |
| <i>Tetrias scabripes</i> .....                  | 200              | <i>Urolophus goodei</i> .....                | 66               |
| <i>Teucrium townsendii</i> .....                | 77               | <i>Uroptychus bellus</i> .....               | 104              |
| <i>Teuthis elegans</i> .....                    | 198              | <i>Uroptychus nitidus occidentalis</i> ..... | 104              |
| <i>Textularia solita inflata</i> .....          | 167              | <i>pubescens</i> .....                       | 104              |
| <i>Thalassoma grammaticum</i> .....             | 72               | <i>Urosalpinx carolinensis</i> .....         | 11               |

|  | No. of<br>Title. |                                      | No. of<br>Title. |
|--|------------------|--------------------------------------|------------------|
| <i>Urosalpinx macra</i> .....              | 11               | <i>Xenochirus pentacanthus</i> ..... | 72               |
| <i>Usinosita</i> .....                     | 224              | <i>triacanthus</i> .....             | 72               |
| <i>Uta clarionensis</i> .....              | 33               | <i>Xenocys jessiae</i> .....         | 66               |
| <i>Valenciennellus stellatus</i> .....     | 198              | <i>Xenomystax atrarius</i> .....     | 92               |
| <i>Vejovis galapagoensis</i> .....         | 67               | <i>rictus</i> .....                  | 198              |
| <i>Venefica ocella</i> .....               | 198              | <i>Xyrias revulsus</i> .....         | 229a             |
| <i>tentaculata</i> .....                   | 198              | <i>Xyrichthys infirmus</i> .....     | 60               |
| <i>Venericardia barbarensis</i> .....      | 68               | <i>ventralis</i> .....               | 60               |
| <i>obliqua</i> .....                       | 19               | <i>Xystroperca</i> .....             | 163              |
| <i>Venus effeminata</i> .....              | 68               | <i>Yarella blackfordi</i> .....      | 139              |
| <i>Verasper</i> .....                      | 163, 187         | <i>Yoldia casta</i> .....            | 189              |
| <i>moseri</i> .....                        | 163, 187         | <i>ensifera</i> .....                | 174              |
| <i>otakii</i> .....                        | 224              | <i>lenticula ambliia</i> .....       | 189              |
| <i>Verecundum rasile</i> .....             | 76               | <i>martyria</i> .....                | 174              |
| <i>Verneuilina pusilla</i> .....           | 167              | <i>regularis</i> .....               | 11               |
| <i>Veronicella agassizi</i> .....          | 229              | <i>scapania</i> .....                | 63               |
| <i>Verticordia perplicata</i> .....        | 63               | <i>Yoldiella curta</i> .....         | 189              |
| <i>Viguiera deltoidea townsendii</i> ..... | 77               | <i>dissimilis</i> .....              | 189              |
| <i>Vireo approximans</i> .....             | 21               | <i>fraterna</i> .....                | 189              |
| <i>bairdi</i> .....                        | 37               | <i>inconspicua</i> .....             | 189              |
| <i>cinereus</i> .....                      | 37               | <i>inflata</i> .....                 | 177              |
| <i>Vireosylvia grandior</i> .....          | 21               | <i>iris</i> .....                    | 189              |
| <i>Vitrinella tryoni</i> .....             | 196              | <i>minuscula</i> .....               | 189              |
| <i>Vöeringia pacifica</i> .....            | 121              | <i>pachia</i> .....                  | 189              |
| <i>Volutilithes philippiana</i> .....      | 63               | <i>subangulata</i> .....             | 189              |
| <i>Volvula minuta</i> .....                | 19               | <i>Zachænus roseus</i> .....         | 62               |
| <i>oxytata</i> .....                       | 19               | <i>Zamenis conirostris</i> .....     | 145              |
| <i>Willemoesia inornata</i> .....          | 104              | <i>lateralis fuliginosus</i> .....   | 145              |
| <i>Xanthias nuttingi</i> .....             | 188              | <i>stejnegerianus</i> .....          | 145              |
| <i>Xanthodes minutus</i> .....             | 118              | <i>Zebrias</i> .....                 | 224              |
| <i>sulcatus</i> .....                      | 104              | <i>Zenaida vinacea-rufa</i> .....    | 21               |
| <i>Xenochirus alascanus</i> .....          | 141              | <i>Zenaidura clarionensis</i> .....  | 82               |
| <i>latifrons</i> .....                     | 72               | <i>Zizyphus townsendi</i> .....      | 129              |

## INDEX TO ALBATROSS BIBLIOGRAPHY.

[Numbers refer to titles, not pages.]

- Abrolhos Islands, 56, 78.  
 Actiniæ, 120, 191, 210.  
 Adeorbis, 196.  
 Æga, 192.  
 Agassiz, Alexander, 64, 74, 85, 86, 183, 208, 209, 212a, 213.  
 Alaska, 59, 69, 71, 75, 87, 99, 112, 126, 129, 141, 173, 207.  
 Alcyonarians, 121.  
 Alexander, A. B., 59, 164, 208.  
 Annelida, 41, 43, 97, 98.  
 Anolis, 219.  
 Arctocephalus, 175.  
 Arcturidæ, 184.  
 Argentine Republic, 62.  
 Atlantic, 5, 10, 12, 16, 20, 27, 28, 44, 45, 47, 54, 58, 70, 127, 136, 138, 147, 157, 158, 177.  
 Bahama Islands, 38, 49, 51, 52, 81, 188, 229b.  
 Bahia, 76.  
 Baird, George W., 8, 9.  
 Baker, Ray Stannard, 215.  
 Bassalian, 5.  
 Batrachia, 49, 62.  
 Baur, G., 161.  
 Bean, Barton A., 135, 199.  
 Bean, Tarleton H., 26, 27, 28, 29, 60, 61, 75, 91, 105, 126, 136, 137, 138, 139, 140.  
 Beard, J. Carter, 102.  
 Feecher, C. E., 103.  
 Beeson, C. H., 128.  
 Benedict, James E., 21, 43, 80, 100, 101, 146, 172, 184, 220, 227.  
 Benedict, James E., and Rathbun, Mary J., 80.  
 Bergh, R., 125.  
 Bering Sea, 99, 111, 117, 132, 141, 146, 159, 160, 164, 176, 185, 186.  
 Bigelow, Robert Payne, 147.  
 Birds, 21, 22, 78, 81, 82, 112, 113, 152, 173, 201.  
 Blake, 29, 139.  
 Bollman, Charles H., 66.  
 Brachiopoda, 54, 63, 142.  
 Brachyura, 188, 200.  
 Branchiocerianthus, 191.  
 Brazil, 56, 62, 76, 78, 171.  
 British Columbia, 61, 174.  
 Brooks, W. K., 99a.  
 Bush, Katharine J., 19, 177, 189, 196.  
 Cable surveys, 88, 89, 90, 111.  
 Calamocrinus, 64, 85.  
 California, 67, 72, 87, 88, 99, 141, 159, 171, 185, 190, 204, 205.  
 Callinectes, 155.  
 Callorhinus, 187.  
 Cape Hatteras, 16, 19.  
 Caribbean Sea, 21, 31, 32, 33, 34, 35, 86.  
 Caroline Islands, 212a, 213, 214.  
 Cathetostoma, 105.  
 Cardiidæ, 222.  
 Caulolepis, 105.  
 Central America (west coast), 74, 85, 86, 99, 104, 107, 108, 109, 110, 121, 122, 123, 124, 125, 130, 148, 149, 150, 151, 152, 167, 179, 180, 183, 191, 198, 206, 219.  
 Cephalopoda, 165.  
 Cetomimidæ, 136.  
 Challenger, 58.  
 Chili, 62.  
 Chimæroid, 138.  
 Clark, George A., 162, 187.  
 Clarke, S. F., 122.  
 Clarion Island, 77, 83.  
 Cockerell, T. D. A., 229.  
 Cocos Island, 152, 219.  
 Collins, J. W., 44, 48.  
 Comatulid, 151.  
 Commander Islands, 111, 160, 185, 187, 190.  
 Cope, E. D., 49, 62, 145.  
 Copepoda, 148.  
 Cramer, Frank, 170.  
 Crinoidea, 33, 64, 85.  
 Crustacea, 10, 20, 39, 40, 47, 80, 100, 101, 104, 106, 118, 119, 146, 147, 149, 153, 154, 155, 172, 173, 187, 217.  
 Cruise of the Albatross, 98a, 225.  
 Cozumel, 22, 36, 37, 60.  
 Curacao, 21.  
 Cyclometopus, 217.  
 Cyclopsetta, 135.  
 Cyclostrema, 196.  
 Dall, William H., 54, 63, 95, 142, 143, 144, 161, 166, 174, 194, 195, 216, 221, 222, 228a.  
 Decapoda, 10, 20, 47.  
 Derichthyidæ, 6.  
 Diatomaceæ, 127.  
 Diplodontidæ, 194.  
 Drake, F. J., 159, 160, 185.  
 Dredging stations, 58, 225.  
 Echini, 32, 34, 41, 157, 183.  
 Eigenmann, Carl H., 128.  
 Eigenmann, C. H., and Beeson, C. H., 128.  
 Elliott, D. G., 168a.  
 Erimacrus, 100.  
 Ethusa, 181.  
 Eupagurus, 101.  
 Eurypharyngidæ, 3a, 6.  
 Evermann, Barton W., 105a, 163.  
 Faxon, Walter, 104, 149.

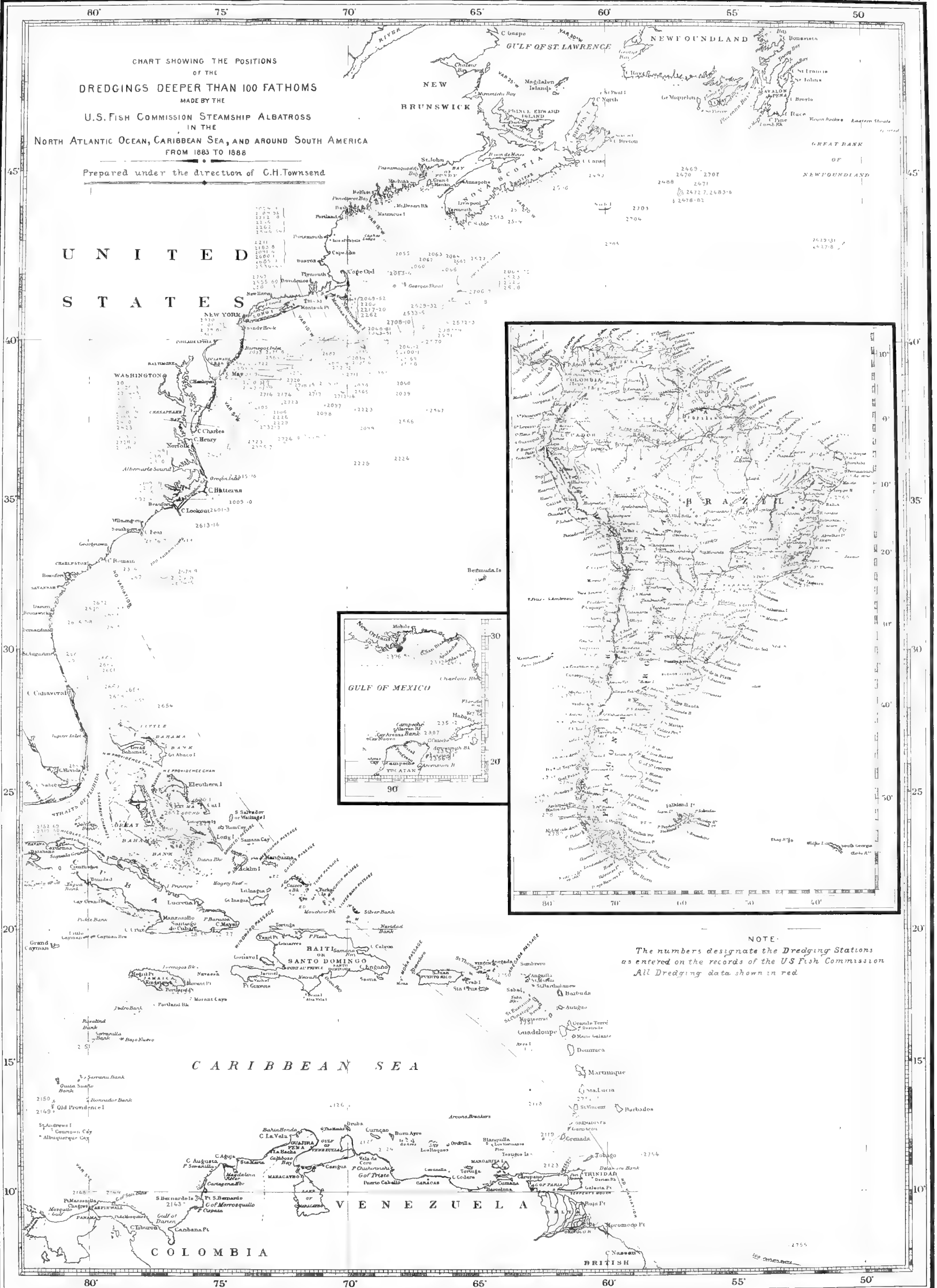
- Fewkes, J. W., 30, 31, 50, 55, 91.  
 Fiji Islands, 213.  
 Fishes, 1, 2, 3, 3a, 5, 6, 7, 25, 26, 27, 28, 29, 66, 72, 73, 75, 76, 92, 93, 105, 128, 135, 136, 137, 138, 140, 141, 163, 170, 176, 187, 196, 199, 204, 224.  
 Fish Hawk, 4, 12, 139.  
 Fishing-grounds, 44.  
 Fisheries, 14, 35, 44, 45, 52, 59, 70, 71, 87, 99, 111, 117, 126, 132, 159, 164, 190, 207.  
 Flint, James M., 193.  
 Florida, 188.  
 Foraminifera, 94, 167, 193.  
 Fringillidæ and other fossils, 79, 129.  
 Fur seals, 132, 159, 160, 162, 175, 185, 186, 187.  
 Galapagos Islands, 57, 62, 64, 66, 67, 70, 73, 74, 78, 85, 92, 104, 107, 108, 109, 110, 115, 121, 122, 123, 124, 125, 130, 144, 148, 149, 150, 151, 152, 161, 167, 178, 179, 180, 183, 191, 197, 198, 203, 206, 219.  
 Garman, Samuel, 198.  
 Gastropoda, 196.  
 Gastropsetta, 135.  
 Geisbrecht, W., 148.  
 Gill, Theodore, 1, 2, 3, 3a, 5, 6, 7, 176, 221.  
 Gill, Theodore, and Ryder, John A., 2, 3a, 7, 230.  
 Gill, Theodore, and Townsend, C. H., 176.  
 Gilbert, Charles H., 72, 73, 92, 93, 141, 170, 171, 204, 205.  
 Gilbert, Charles H., and Cramer, Frank, 170.  
 Gilbert Islands, 612a, 213, 214.  
 Göes, A., 94, 167.  
 Goode, G. Brown, 58a, 91, 136, 137, 138, 139, 140, 167a.  
 Goode, G. Brown, and Bean, Tarleton H., 27, 28, 29, 91, 136, 137, 138, 139, 140, 167a.  
 Grand Banks, 24.  
 Guadalupe Island, 175.  
 Gulf of California, 74, 83, 84, 86, 87, 92, 93, 107, 108, 109, 110, 116, 117, 121, 122, 123, 124, 125, 148, 150, 151, 152, 167, 183, 191, 206, 219.  
 Gulf of Mexico, 27, 31, 32, 33, 34, 44, 45.  
 Gulf Stream, 16, 30, 55.  
 Hansen, H. J., 180.  
 Harriotta, 138.  
 Hartlaub, C., 151.  
 Hawaiian Islands, 88, 89, 90, 111, 118, 142, 170, 190.  
 Heteropoda, 114.  
 Heteromi, 137.  
 Hermit crabs, 220.  
 Hexactinellida, 232.  
 Hickson, Sidney J., 131.  
 Holothuria, 107, 124.  
 Howard, L. O., 67.  
 Hydroida, 41, 122, 218.  
 Inachidæ, 154.  
 Insects, 67, 203.  
 Isopoda, 180, 192, 202, 223.  
 Japan, 190, 213, 224.  
 Jordan, David Starr, 65, 66, 76, 162, 163, 186, 187, 224.  
 Jordan, David Starr, and Bollman, Charles H., 191.  
 Jordan, David Starr, and Evermann, Barton W., 163.  
 Jordan, D. S., and Snyder, J. O., 224, 226, 229a.  
 Knowlton, F. H., 129.  
 Kuril Islands, 190, 201.  
 Ladrone Islands, 212a, 213, 214.  
 Lepadidæ, 177.  
 Leptonacea, 195.  
 Leptophidium, 27.  
 Linnell, M. E., 203.  
 Lithodidæ, 146.  
 Lizards, 219, 229b.  
 Lower California, 62, 67, 72, 87, 116, 175.  
 Ludwig, H., 107, 124.  
 Lucas, F. A., 78, 162, 187.  
 Lucinacea, 228a.  
 Lütken, C. F., 197.  
 Mactridæ, 143.  
 McDonald, M., 74, 126.  
 McMurrich, J. P., 120.  
 Maiidæ, 119.  
 Mann, A., 127.  
 Maas, O., 179.  
 Malpelo Island, 152, 219.  
 Mark, E. L., 191.  
 Marquesas Islands, 212a, 213, 214.  
 Marshall Islands, 212a, 213, 214.  
 Mayer, A. J., 208.  
 Medusæ, 30, 31, 50, 55, 179.  
 Merrill, G. P., 110.  
 Merriam, C. Hart, 175.  
 Mesodesmatidæ, 143.  
 Mexico (west coast), 74, 85, 86, 99, 104, 107, 108, 109, 110, 113, 121, 122, 123, 124, 125, 130, 148, 149, 150, 151, 152, 167, 179, 180, 183, 191, 197, 198, 206, 219.  
 Mid-Pacific, 208.  
 Mollusca, 11, 12, 18, 19, 54, 63, 68, 95, 103, 115, 142, 143, 144, 161, 166, 174, 189, 221, 222, 228a.  
 Moore, H. F., 208, 214.  
 Moser, J. F., 162, 187, 190, 207, 208.  
 Murray, Sir John, 215, 233.  
 Murray, Joseph, 187.  
 Muller, G. W., 150.  
 Nemerteans, 97, 158, 206.  
 Nemichthyoid, 2.  
 New England coast, 11, 17, 18, 35, 52, 97.  
 New Granada, 21.  
 Neusina, 94.  
 Nuculidæ, 177.  
 Nutting, C. C., 218.  
 Nye, W., 24, 25.  
 Octopus, 25.  
 Old Providence, 21.  
 Ophiurans, 156, 197, 212.  
 Opisthobranchien, 125.  
 Opisthoteuthidæ, 165.  
 Oregon, 59, 72, 87, 99.  
 Orthoptera, 108.  
 Ortmann, A., 130.  
 Ostracoda, 150.  
 Pacific coast, 62, 68, 82, 117, 118, 128, 141, 142, 146, 147, 164, 166, 171, 202.  
 Pacific Ocean, 212a.  
 Palicus, 182.  
 Pagurus, 220.  
 Panama, 62, 67, 73, 92, 163, 167, 171.  
 Panopeus, 80.  
 Pantopodes, 109.  
 Patagonia, 76.  
 Paumotu Islands, 212a, 213, 214.  
 Pearl fishery, 84.  
 Peck, James I., 114.  
 Pelagic, 130, 133, 139, 148.

- Pelagic sealing, 132, 160, 162, 164, 185.  
 Penæidæ, 39.  
 Periceridæ, 106.  
 Petrel, 23, 113, 152.  
 Planarians, 98, 153.  
 Planktonemertes, 206.  
 Plants, 69, 77.  
 Plectromus, 26.  
 Plumularidæ, 218.  
 Port Castries, 65.  
 Pribilof Islands, 111, 132, 159, 160, 162, 164, 185, 190.  
 Pteropoda, 114.  
 Rathbun, Mary J., 80, 106, 118, 119, 153, 154, 155, 181, 182, 188, 200, 217.  
 Rathbun, Richard, 32, 33, 34, 59, 96, 117.  
 Reptilia, 49, 62, 83, 145, 219, 229b.  
 Richardson, Harriet, 173, 192, 202, 223.  
 Ridgway, R., 21, 22, 23, 36, 37, 38, 51, 56, 57, 81, 112, 113, 178, 228.  
 Robben Island, 190.  
 Rocks, 110.  
 Rondeletidæ, 136.  
 Rose, J. N., 77.  
 Sabanilla, 21.  
 Saccopharyngoid, 7, 231.  
 Salmon, 126, 207.  
 Salpa, 99a.  
 Santa Barbara Islands, 82, 93.  
 Santa Catalina Island, 204.  
 San Clemente Island, 67.  
 Schimkewitsch, W. M., 109.  
 Schroeder, S., 15.  
 Schizopoda, 130.  
 Schulze, Frz. Eilhard, 232.  
 Scudder, S., 108.  
 Sebastinæ, 128.  
 Smith, Hugh M., 207, 208, 209.  
 Smith, Sanderson, 58.  
 Smith, S. I., 10, 20, 39, 40, 47.  
 Snyder, J. O., 224.  
 Socorro Island, 77, 83.  
 Society Islands, 213.  
 Solenidæ, 216.  
 South America, 67, 85, 149, 179, 180, 197, 198.  
 South Sea expedition, 208, 209, 213, 214.  
 Sphæromidæ, 173.  
 Spindalis, 51.  
 St. Lucia, 56, 65, 67.  
 St. Thomas, 21.  
 Stalk-eyed Crustacea, 149.  
 Starfishes, 156, 211.  
 Stearns, R. E. C., 68, 115, 116.  
 Stejneger, L., 162, 187, 201, 219, 229b.  
 Stephanoberycidæ, 6.  
 Stomatopoda, 147.  
 Straits of Magellan, 56, 63, 70, 78, 79.  
 Studer, T., 121.  
 Synidotea, 172.  
 Tanner, Z. L., 4, 13, 14, 35, 45, 46, 52, 53, 59, 70, 71, 87, 88, 89, 90, 99, 111, 132, 133, 134, 159, 169.  
 Tanner, Z. L., and Drake, F. J., 159.  
 Telmessus, 100.  
 Tellinidæ, 221.  
 Terebratalia, 103.  
 Tonga Islands, 212a, 213, 214.  
 Tow-net, 133, 168, 169.  
 Townsend, C. H., 59, 82, 83, 84, 112, 152, 162, 164, 168, 176, 187, 208.  
 Tres Marias Islands, 116.  
 Tropical Pacific, 94, 208, 209, 212a, 213, 218, 225.  
 True, F. W., 164.  
 Tunicata, 41, 187.  
 Turbellaria, 123.  
 United States of Colombia, 66.  
 Vasey, G., 69, 76.  
 Verrill, A. E., 11, 12, 16, 17, 18, 41, 97, 98, 156, 157, 158, 165, 177, 189, 210, 211, 212.  
 Verrill, A. E., & Bush, K. J., 177, 189.  
 Venezuela, 21.  
 Vitrinella, 196.  
 Washburn, F. L., 42.  
 Washington, 59, 72, 87, 99, 141, 159, 185.  
 West Indies, 15, 56, 62, 70, 153, 195, 212, 216.  
 White, C. A., 79.  
 Woodworth, W. McM., 123, 206, 208.  
 Yucatan, 22, 37, 60.









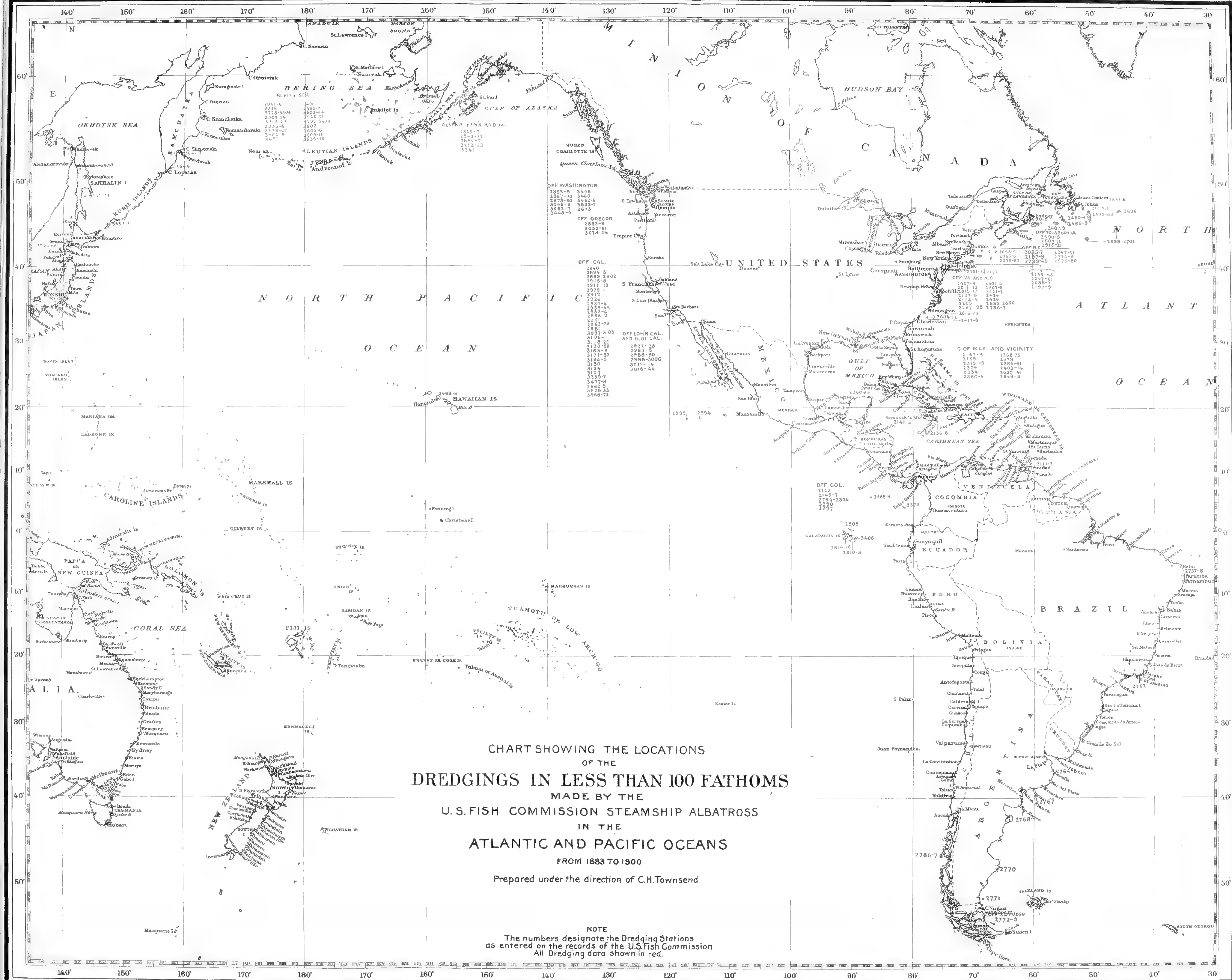




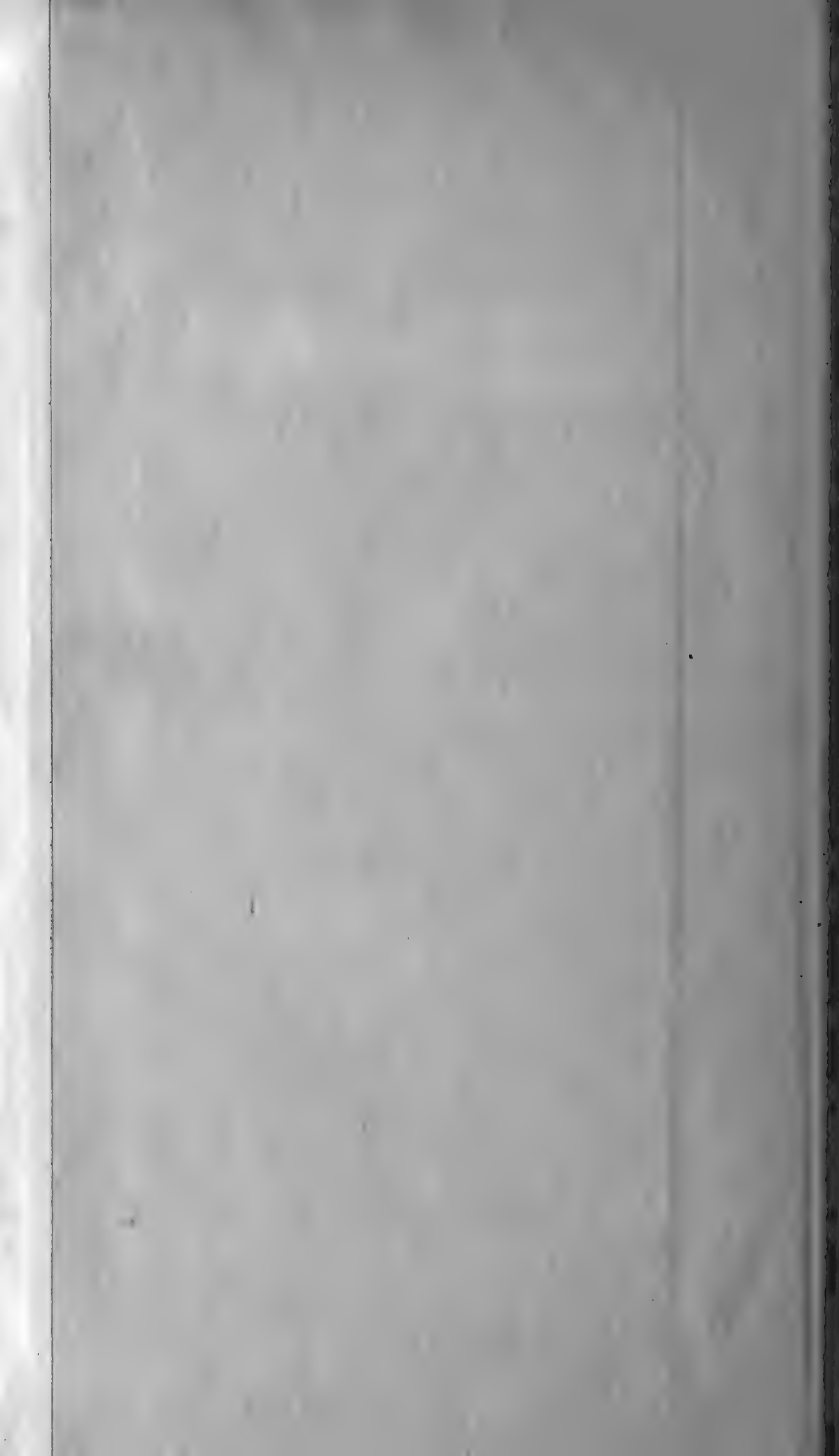












# INDEX.

|   | Page.                       |   | Page.              |
|---|-----------------------------|---|--------------------|
| <i>Abramis crysoleucas</i> .....  | 128, 134                    | Battery Station Report .....                                | 49                 |
| <i>Achirus fasciatus</i> .....  | 134                         | Battle Creek .....  | 5                  |
| Agana .....   | 160                         | Station Report .....  | 90                 |
| Agassiz, Alexander .....  | 21, 137, 163                | Bean, Barton A. ....  | 122, 124           |
| Agassiz, Maximilian .....   | 137                         | Beaufort Laboratory .....                                   | 18, 125            |
| Ahii .....  | 138                         | Beaver Island .....   | 26                 |
| Aitutake .....  | 144                         | Bellevue, Fish collected near .....                         | 9, 74              |
| Alaska Seal Herds .....   | 21                          | Bellows, O. F. ....   | 120                |
| Albatross, Steamer, Dredging and other Re-<br>cords of, with Bibliography relative to the<br>work of the Vessel ..... | 387-562                     | Benedict, James E. ....                                     | 122, 124, 135      |
| Albatross South Sea Expedition, Narrative<br>of .....   | 137-161                     | Berger, E. W. ....  | 125                |
| Albatross, Steamer .....  | 21, 137, 151, 153, 161, 163 | Bibliography relative to the work of the<br>Albatross ..... | 501-562            |
| Albemarle Sound .....   | 8                           | Bigelow, Maurice A. ....                                    | 122                |
| Alexander, A. B. ....   | 137                         | Bigelow, Robert P. ....                                     | 122, 135           |
| Alpena Station .....  | 69                          | Biological Inquiries .....                                  | 17                 |
| <i>Ambloplites rupestris</i> .....  | 130                         | Laboratories .....  | 122-126            |
| <i>Ameiurus catus</i> .....   | 134                         | Survey of Lake Erie .....                                   | 19                 |
| <i>nebulosus</i> .....  | 127                         | Birds on South Sea Islands .....                            | 157                |
| <i>Amia calva</i> .....   | 134                         | Birge, E. A. ....   | 132                |
| Anaa .....  | 140                         | Black Bass .....  | 52, 56, 57, 60, 71 |
| Andema Island .....   | 157                         | Distribution .....  | 113-116            |
| <i>Anguilla chrysypa</i> .....  | 128, 130                    | Blackford, E. G. ....                                       | 127                |
| Apaiang Island .....  | 151                         | Black-spotted Trout .....                                   | 81, 84             |
| Apamama .....   | 151, 152                    | Distribution .....  | 105-106            |
| Apataki .....   | 140                         | Blackwater River .....                                      | 130                |
| Appropriations for Fish Commission .....  | 24                          | Blount, R. E. ....  | 122                |
| <i>Argyrosomus osmeriformis</i> .....   | 130                         | Blueback Salmon .....                                       | 6, 26, 95, 97      |
| Arhno Atoll .....   | 153, 154                    | Distribution .....  | 100                |
| Aquarium at Central Station .....   | 54                          | Blue Bream .....  | 134                |
| Fish-hatching in .....  | 54                          | Blue Wing, Launch .....                                     | 33, 45, 51, 122    |
| Aquatic Fauna of Porto Rico .....   | 135                         | <i>Boleichthys fusiformis</i> .....                         | 134                |
| Plants, Nutrition of .....  | 131                         | Booth & Co .....  | 69                 |
| Arizona Investigations .....  | 134                         | Booth, D. C. ....   | 81                 |
| Arorai Island .....   | 151                         | Bora Bora .....   | 144                |
| Atkins, C. G. ....  | 33, 36                      | Boston Fisheries .....                                      | 167, 361           |
| Atlantic Salmon .....   | 9, 32, 36                   | Fishing Products landed at .....                            | 20                 |
| Distribution .....  | 99                          | Sportsmen's Association .....                               | 34, 43             |
| <i>Atya</i> .....   | 143                         | Bowers, George M. ....                                      | 122                |
| Avatu Pass .....  | 138                         | Bozeman Station .....                                       | 6, 9               |
| Babcock, Warren E. ....   | 122                         | Report .....  | 83                 |
| Baird Station .....   | 25                          | Bread Fruit .....   | 154                |
| Port .....  | 85                          | Bream Distribution .....                                    | 117                |
| Baker Lake Station .....  | 6, 26                       | Breed, R. S. ....   | 122                |
| Report .....  | 96                          | Brood Cod held at Woods Hole .....                          | 32                 |
| Baltimore Fish Trade .....  | 285                         | Brook Trout .....   | 29, 34,            |
| Bartlett, S. P. ....  | 71                          | 39, 42, 43, 48, 56, 60, 65, 71, 79, 82, 84                  |                    |
| Basses, Propagation of .....  | 9                           | Distribution .....  | 106-110            |
| Bass Lake .....   | 132                         | Brooks, W. K. ....  | 125                |
| Bats on South Sea Islands .....   | 158                         | Brown, J. E. ....   | 53                 |
| Fruit .....   | 158                         | Bryan Point Station Report .....                            | 51                 |
|   |                             | Bruce Lake .....  | 182                |
|   |                             | Buck, H. H. ....  | 81, 96             |

|   | Page.                    |  | Page.  |
|---|--------------------------|--|--|
| Buckhannon River.....                       | 130                      | Columbia River Basin, Fish-culture.....    | 5, 25  |
| Bumpus, H. C.....                           | 18, 45, 46, 122, 127     | Connecticut Fisheries.....                 | 379-386  |
| Burrage, Thomas J.....                      | 122, 124                 | Contents.....                              | 3  |
| Butaritari.....                             | 151, 153                 | Convict Settlement at Tonga Islands.....   | 145  |
| California Fish Commission.....             | 56                       | Cook Group.....                            | 144  |
| Investigations.....                         | 134                      | Cook, O. F.....                            | 135  |
| Cambarus.....                               | 134                      | Coral.....                                 | 151  |
| Campbell, S. H.....                         | 83                       | Coregonus clupeiformis.....                | 130  |
| Canned Salmon as Food for Young Fishes..... | 6                        | Corliss, C. G.....                         | 45   |
| Canoe Building in Marshall Islands.....     | 155                      | Craig Brook Station Report.....            | 36   |
| Cape Vincent Station.....                   | 27, 33                   | Crampton, H. E.....                        | 125  |
| Report.....                                 | 47                       | Crabs.....                                 | 204, 224, 226, 262, 267, 269, 270, 298, 310, 311 |
| Callinectes.....                            | 134                      | Crappie.....                               | 53, 71   |
| Cambridge Fish Trade.....                   | 285                      | Distribution.....                          | 116  |
| Canning Industry of Maine.....              | 335                      | in Potomac River.....                      | 30   |
| Carleton, L. T.....                         | 128                      | Crayfish.....                              | 79   |
| Caroline Islands.....                       | 153                      | Crisfield Fish Trade.....                  | 285  |
| Carp.....                                   | 57                       | Crozer Mountain.....                       | 156  |
| Carp as Food for Young Fish.....            | 53, 66                   | Cusk landed at Boston.....                 | 167  |
| Increased use of.....                       | 20, 164, 178             | Boston and Gloucester.....                 | 171  |
| Carter, E. N.....                           | 92                       | Gloucester.....                            | 169  |
| Cat-fish.....                               | 113, 134                 | Cygnets, Launch.....                       | 45, 122  |
| Catostomus commersonii.....                 | 128                      | Dall, W. H.....                            | 135  |
| Catalogue of Publications relative to the   |                          | Darling Pond.....                          | 40   |
| Work of the Albatross.....                  | 501-535                  | Davenport, C. B.....                       | 132  |
| Central Station Report.....                 | 53                       | Davies, J. A.....                          | 30   |
| Chabral Harbor.....                         | 156                      | Dean, H. D.....                            | 77   |
| Chamorros.....                              | 160                      | Decline of Lobster and Clam Fisheries..... | 18   |
| Charlevoix.....                             | 26                       | Decrease of Lobster Fishery.....           | 8, 18, 28  |
| Cheat River.....                            | 130                      | Delaware Fisheries.....                    | 263-267  |
| Chesapeake and Ohio Canal, Fish taken       |                          | Delaware River, Shad-culture.....          | 8  |
| from.....                                   | 31                       | Details of Distribution.....               | 98-118   |
| Chester Fish Trade.....                     | 262                      | Detroit Hatchery.....                      | 6, 33, 67, 68                                    |
| Child, C. M.....                            | 132                      | De Witt, William G.....                    | 30   |
| Childs, H. A.....                           | 123                      | Dimick, F. F.....                          | 164  |
| Chinese Shrimp Fishery of San Francisco     |                          | Dip-net Trials with Electric Light.....    | 489  |
| Bay.....                                    | 182                      | Diseases of Fishes.....                    | 18, 72   |
| Christianity in South Sea Islands.....      | 148, 149, 156            | Distribution and Propagation of Food-      |  |
| Chub.....                                   | 134                      | fishes.....                                | 25-118   |
| Clackamas River.....                        | 25                       | Details of.....                            | 98-118   |
| Station Report.....                         | 91                       | of Fish and Eggs among States              |  |
| Clam Cultivation.....                       | 18, 123                  | and Territories.....                       | 12-15  |
| Fishery, Decline of.....                    | 18                       | Summary of.....                            | 15   |
| Statistics.....                             | 204, 226, 264, 270, 289, | Doty, J. L.....                            | 182  |
| 309, 319, 320, 336, 360, 367, 375, 385      |                          | Downing, S. W.....                         | 63, 91   |
| Growth of.....                              | 123                      | Drake, F. J.....                           | 392  |
| Investigations.....                         | 127                      | Dredging and Other Records of the U. S.    |  |
| Clark, F. N.....                            | 64                       | Fish Commission steamer Albatross, with    |  |
| Clark, Hubert L.....                        | 122, 124, 135            | Bibliography relative to the work of the   |  |
| Cloth Weaving in South Sea Islands.....     | 159                      | vessel.....                                | 387-562  |
| Cobb, John N.....                           | 163, 196, 213            | Dress of South Sea Islanders.....          | 158  |
| Cobbosseecontee Lake.....                   | 18, 128                  | Drowne, F. P.....                          | 123  |
| Cod.....                                    | 5                        | Drummond Lake.....                         | 133  |
| Culture.....                                | 7, 27, 44, 46            | Dublin Pond.....                           | 32   |
| Distribution.....                           | 118                      | Dudley, W. H.....                          | 123  |
| Fishery.....                                | 20                       | Duerden, J. E.....                         | 135  |
| Landed at Boston.....                       | 167                      | Dula.....                                  | 143  |
| Boston and Gloucester.....                  | 171                      | Duluth Station Report.....                 | 70   |
| Gloucester.....                             | 169                      | Dunmore Lake.....                          | 41   |
| Observations concerning.....                | 7                        | Eastern Oysters on Pacific Coast.....      | 120  |
| Coe, Wesley R.....                          | 135                      | in San Francisco Bay.....                  | 179  |
| Cogswell, T. M.....                         | 163, 196, 213            | East Orland.....                           | 32   |
| Coker, R. E.....                            | 125                      | Edenton Station.....                       | 8, 23, 28, 33                                    |
| Cold Spring Station.....                    | 22                       | Report.....                                | 57   |
| Collecting by Explosives.....               | 152                      | Edwards, Vinal N.....                      | 123  |
| in South Sea Islands.....                   | 150                      | Egg Development, Method of Recording..     | 185-194  |

|   | Page.                         |   | Page.                          |
|---|-------------------------------|---|--------------------------------|
| Eggs and Fish furnished for Distribution .. | 10-11                         | Fur-seal Rookeries of Pribilof Islands..... | 177                            |
| Eigenmann, C. H.....                        | 133                           | Garstang, Walter .....                      | 127                            |
| Elk Creek .....                             | 93                            | Genera and Species described as new in      |                                |
| Electric Light, Dip-net Trials with.....    | 489                           | Albatross Papers.....                       | 543-559                        |
| Elk River.....                              | 19, 130                       | Gibboney, A. H.....                         | 30                             |
| Ellice Islands .....                        | 148, 151, 153                 | Gilbert, Charles H.....                     | 134                            |
| Ellis, J. Frank.....                        | 31                            | Gilbert Islands .....                       | 151, 153                       |
| Elmore .....                                | 153                           | Gill-net Stations of the Albatross .....    | 489                            |
| Enemies of Fish.....                        | 60, 77                        | Gillum, R. S.....                           | 133                            |
| Enneacanthus gloriosus.....                 | 134                           | Gilmer, Henry.....                          | 30                             |
| Erwin Station .....                         | 31                            | Gilmer, W. C.....                           | 29                             |
| Report.....                                 | 59                            | Gloucester Fisheries.....                   | 167, 361                       |
| Eua.....                                    | 144                           | Fishing Products landed at.....             | 20                             |
| Eucalia inconstans .....                    | 128                           | Fresh Fish Company.....                     | 362                            |
| Eupomotis gibbosus .....                    | 129, 130, 134                 | Islands .....                               | 142                            |
| Evermann, B. W .....                        | 19, 132, 133, 135             | Station Report.....                         | 45                             |
| Evermann, T. B.....                         | 133                           | Golden Trout.....                           | 35, 41                         |
| Fakarava.....                               | 140                           | Distribution.....                           | 111                            |
| Falcon Island .....                         | 145                           | Graham, J. Y.....                           | 125                            |
| Farallon de Pajaros .....                   | 161                           | Grampus, Schooner.....                      | 8, 18, 27, 28, 32, 44, 46, 122 |
| Fassett, H. C .....                         | 137                           | Grapsidæ .....                              | 144                            |
| Field, G. W.....                            | 123                           | Grave, Caswell .....                        | 120, 125                       |
| Fijians .....                               | 147                           | Grayling .....                              | 9, 39, 42, 66, 73, 81, 83, 92  |
| Fiji Islands.....                           | 146                           | Distribution .....                          | 111                            |
| Filkins, B. G .....                         | 64                            | Great Lakes, Fish-culture on.....           | 26                             |
| Fish and Eggs distributed among States      |                               | Greenbrier River.....                       | 19, 130                        |
| and Territories .....                       | 12-15                         | Green, Erik H.....                          | 123, 124                       |
| furnished for distribution. 10-11           |                               | Green Lake Station .....                    | 32, 34                         |
| Fish and Game Association of District of    |                               | Green, Myron.....                           | 48                             |
| Columbia.....                               | 31                            | Green, Seth.....                            | 129                            |
| Fish collected from Overflowed Lands.....   | 74                            | Guam .....                                  | 159                            |
| Fish-Culture, Results of .....              | 29                            | Guard, J. E.....                            | 59                             |
| Fish-cultural Work, Progress of.....        | 5                             | Haddock landed at Boston.....               | 167                            |
| Fish Disease.....                           | 72                            | Boston and Gloucester.....                  | 172                            |
| Fish distributed, total.....                | 5                             | Gloucester.....                             | 170                            |
| Fisheries of Lake Erie .....                | 164                           | Hahn, E. E.....                             | 18, 33, 44, 45, 127            |
| Lake Ontario.....                           | 166                           | Hake landed at Boston.....                  | 168                            |
| New England States. 174-177, 311-386        |                               | Hake landed at Boston and Gloucester.....   | 172                            |
| Fishes commonly taken in Shrimp Nets...     | 184                           | Gloucester .....                            | 170                            |
| held in Aquarium, List of .....             | 55                            | Halibut.....                                | 343                            |
| Fish Hawk, Report of Operations.....        | 49                            | landed at Boston .....                      | 168                            |
| Steamer .....                               | 8, 17,                        | Boston and Gloucester.....                  | 172                            |
| 18, 19, 22, 28, 31, 57, 122, 133, 135, 163  |                               | Gloucester .....                            | 170                            |
| Fishing among South Sea Islands.....        | 150                           | Hall, Ansley.....                           | 163, 196, 213                  |
| Fishing-grounds and FooC-fishes, Inquiry    |                               | Hamaker, J. I.....                          | 125                            |
| respecting .....                            | 119-135                       | Handy, L. B.....                            | 43, 60                         |
| Fish Lakes at Washington, D. C.....         | 52                            | Hanson, G. F. O .....                       | 44, 46                         |
| Flat-fish Culture .....                     | 5, 8, 28                      | Hapai Group .....                           | 145                            |
| Distribution.....                           | 118                           | Hargitt, C. W .....                         | 123, 135                       |
| Flint, James M.....                         | 135                           | Harron, L. G .....                          | 31, 51, 54                     |
| Flounder, Alimentary Tract of.....          | 124                           | Hatching Fish in Aquarium.....              | 54                             |
| Flounders, Fishery for .....                | 349                           | Hay, W. P .....                             | 19, 130                        |
| Fongafale .....                             | 148, 150                      | Heath, Harold.....                          | 123                            |
| Food-fishes and Fishing-grounds, Inquiry    |                               | Henshall, James A.....                      | 83                             |
| respecting .....                            | 119-135                       | Hepburn, A. J.....                          | 137                            |
| Report on Propagation and                   |                               | Herrick, C. J.....                          | 123                            |
| Distribution of .....                       | 25-118                        | Herring Fisheries.....                      | 344                            |
| Food for Aquarium Fish .....                | 54                            | Hessel, Rudolph .....                       | 52                             |
| Young Fish.....                             | 6, 36, 38, 53, 59, 74, 76, 77 | Hihifa .....                                | 145                            |
| Fox, J. C.....                              | 33, 63                        | Hikueru.....                                | 141, 142                       |
| Francis, W. W.....                          | 123                           | Hill, Charles.....                          | 131, 132                       |
| Frandsen, Peter.....                        | 123                           | Hill, W. F.....                             | 120                            |
| Free Transportation furnished by Railroads  | 15                            | Holmes, J. A .....                          | 120, 133                       |
| Frewen, Moreton.....                        | 31                            | Holmes, S. J .....                          | 123                            |
| Fruit Bats .....                            | 158                           | Hopper, E. L.....                           | 49                             |
| Funafuti .....                              | 148, 151                      | Howe, Freeland, jr .....                    | 123, 124                       |

|   | Page.             |  | Page.               |
|---|-------------------|--|---------------------|
| Hruby, Charles .....                          | 75                | Lette .....                                      | 145                 |
| Hubbard, W. F. ....                           | 42, 91            | Lewes Menhaden Factories .....                   | 267                 |
| Hume, R. D. ....                              | 6, 92             | Lewis, A. B. ....                                | 123, 131, 132       |
| Hunt, Logan .....                             | 37                | Likieb .....                                     | 153                 |
| Hunt, W. B. ....                              | 90                | Lindsey, W. T. ....                              | 54                  |
| Hybrid Trout .....                            | 39, 111           | Linton, Edwin .....                              | 123, 124            |
| Hydrographic Soundings of the Albatross ..... | 420-476           | Little White Salmon Station .....                | 25, 94              |
| Indiana, Investigations in .....              | 132               | Lobster Culture .....                            | 8, 28, 45, 46       |
| Inland Waters, Investigations of .....        | 18                | Distribution .....                               | 118                 |
| Intermediate and Surface Tow-net Stations     |                   | Fishery Statistics .....                         | 212, 218, 224, 249, |
| of the Albatross .....                        | 477-488           | 263, 265, 316, 326, 335, 341, 347, 360, 365, 385 |                     |
| Ireland, Shad Eggs sent to .....              | 31                | Fishery, Decrease of .....                       | 8, 18, 20, 28, 180  |
| Ironsides, C. N. ....                         | 31                | Investigations .....                             | 127                 |
| Jakoits .....                                 | 156               | Loch Leven Trout .....                           | 66, 80, 82          |
| Jaluit .....                                  | 153, 154, 156     | Distribution .....                               | 101                 |
| Jarvis, W. F. ....                            | 84                | Locke, E. F. ....                                | 44                  |
| Jennings, H. S. ....                          | 131, 132          | Locy, W. A. ....                                 | 67                  |
| Jennings, Mrs. H. S. ....                     | 131, 132          | Losap Island .....                               | 157                 |
| Johnson, J. M. ....                           | 123               | Lottin Port .....                                | 156                 |
| Johnson, R. H. ....                           | 123               | Lucius americanus .....                          | 134                 |
| Johnson, R. S. ....                           | 72                | reticulatus .....                                | 128, 134            |
| Johnson, T. H. ....                           | 80                | Lynnhaven Oyster Experiments .....               | 17, 119             |
| Johnson W. H. ....                            | 49                | Mackerel Investigations .....                    | 127                 |
| Jones, Alexander .....                        | 59                | landed at Boston .....                           | 168                 |
| Juday, C. ....                                | 133               | Boston and Gloucester .....                      | 173                 |
| Kambara .....                                 | 146, 148          | Gloucester .....                                 | 170                 |
| Kellogg, J. L. ....                           | 123               | Maiana Island .....                              | 151                 |
| Kempff, C. S. ....                            | 137               | Maine Fish Commission .....                      | 30, 36, 46          |
| Kendall, W. C. ....                           | 18, 128           | Fisheries .....                                  | 322-340             |
| King-crab Industry .....                      | 267               | Makatea .....                                    | 139                 |
| King, E. S. ....                              | 163, 196, 213     | Makemo .....                                     | 140                 |
| Kirsch, P. H. ....                            | 135               | Manchester Station Report .....                  | 72                  |
| Kiti Harbor .....                             | 156               | Manistique .....                                 | 26                  |
| Kittery Point, Me .....                       | 7                 | Mann Brook .....                                 | 34                  |
| Knight, Charles R. ....                       | 123, 124          | Maraki Island .....                              | 151                 |
| Kusaie .....                                  | 156, 159          | Marks, H. H. ....                                | 69                  |
| Kwajalong .....                               | 153               | Marquesas Group .....                            | 137                 |
| Lake Dunmore .....                            | 41                | Marsh, M. C. ....                                | 127, 135            |
| Lake Erie Fisheries .....                     | 164               | Marshall Islands .....                           | 151, 153            |
| Investigations .....                          | 131               | Islanders, Characteristics of .....              | 155                 |
| Pike Perch in .....                           | 7                 | Martin, S. J. ....                               | 164                 |
| Statistics of Fisheries .....                 | 20                | Maryland Fisheries .....                         | 268-287             |
| White-fish work on .....                      | 7                 | Massachusetts Fisheries .....                    | 343-363             |
| Lake Mitchell .....                           | 40                | Mataiwa .....                                    | 139                 |
| Lake Ontario Fisheries .....                  | 20, 166           | Mat-making in Marshall Islands .....             | 155                 |
| Quinnat Salmon in .....                       | 30                | Mattamuskeet Lake .....                          | 19, 133             |
| Lake Superior, White-fish work on .....       | 6                 | Maxinkuckee Lake .....                           | 19, 132             |
| Lake Trout .....                              | 5, 42, 48, 65, 81 | Mayer, A. G. ....                                | 137                 |
| Distribution .....                            | 110-111           | Maywood, C. G. ....                              | 123                 |
| Propagation .....                             | 6, 26             | McClellan, J. H. ....                            | 131, 132            |
| Lambson, G. H. ....                           | 85, 90            | McCloud River .....                              | 5, 25               |
| Landlocked Salmon .....                       | 18, 34, 37, 39    | McKibben, E. C. ....                             | 123                 |
| Distribution .....                            | 99-100            | McMorris, B. K. ....                             | 137                 |
| Large-mouth Black Bass .....                  | 30, 134           | Mead, A. D. ....                                 | 123                 |
| Distribution .....                            | 113-116           | Measurement of Fish Eggs .....                   | 40                  |
| Large, T. ....                                | 133               | Meek, S. E. ....                                 | 129                 |
| Lau Group .....                               | 146, 148          | Mehetia .....                                    | 142                 |
| Leadville Station Report .....                | 79                | Menhaden Fisheries .....                         | 221, 253, 267       |
| Leary, Governor .....                         | 160               | Menidia beryllina .....                          | 134                 |
| Leary, J. L. ....                             | 76                | Mensch, P. Calvin .....                          | 123                 |
| Ledgerwood, Leroy .....                       | 85                | Merganser, Launch .....                          | 122                 |
| Lee, T. G. ....                               | 123               | Methods and Statistics of Fisheries .....        | 163-184             |
| Leeward Islands .....                         | 144               | Michigan Fish Commission .....                   | 7, 33, 64, 67       |
| Lefevre, George .....                         | 135               | Legislature .....                                | 6                   |
| Lepomis auritus .....                         | 128               | White-fish Hatcheries .....                      | 6                   |
| pallidus .....                                | 53, 134           | Micropterus dolomieu .....                       | 128, 130            |

|   | Page.                    |   | Page.                  |
|---|--------------------------|---|------------------------|
| Micropterus salmoides.....                  | 134                      | Oyster Investigations.....                | 119-121                |
| Middle Atlantic States, Statistics of Fish- |                          | Oysters in San Francisco Bay .....        | 179                    |
| eries of.....                               | 195-310                  | on Pacific Coast .....                    | 120                    |
| Migrations of Fish.....                     | 18                       | planted in Willapa Bay.....               | 17                     |
| Miller, C. R.....                           | 137                      | Pacific Coast, Fish-culture on.....       | 5                      |
| Milligan, John D.....                       | 122, 133                 | Investigations on .....                   | 19                     |
| Missionaries in South Seas.....             | 140                      | Salmon .....                              | 85, 90, 91, 93, 95, 97 |
| Missisquoi River.....                       | 7, 26, 47                | Page, W. F.....                           | 42                     |
| Mitchell Lake .....                         | 40                       | Pakaka.....                               | 140                    |
| Moen Island.....                            | 157, 159                 | Palæmonetes.....                          | 134                    |
| Moenkhaus, W. J.....                        | 39, 123                  | Pamlico Sound .....                       | 133                    |
| Monongahela River.....                      | 19, 130                  | Papeete .....                             | 139, 142               |
| Monroe Piers.....                           | 7, 26, 33, 61            | Parker, G. H.....                         | 123                    |
| Montana, Trout in .....                     | 6, 29                    | Patton, J. D.....                         | 30                     |
| Moore, H. F.....                            | 17, 120, 135, 137        | Paumotu Islands .....                     | 138, 140, 151, 153     |
| Moore, H. F., on South Sea Expedition ..    | 137-161                  | Pearl Fishery at Hikueru .....            | 141                    |
| Moore, J. Percy.....                        | 132, 135                 | of Tuamotu Archipelago ....               | 181                    |
| Morone americana.....                       | 128, 134                 | Pearl, Raymond .....                      | 132                    |
| Moser Basin .....                           | 137                      | Pearson, T. G.....                        | 125                    |
| Moser, Jefferson F.....                     | 21, 137, 392             | Penning Pike Perch.....                   | 63                     |
| Mussels destructive to Oysters.....         | 377                      | White-fish.....                           | 61                     |
| Mya arenaria.....                           | 18                       | Pennsylvania Fisheries .....              | 255-262                |
| Namu .....                                  | 153                      | Penobscot River Salmon Fishery.....       | 333                    |
| Namu Island .....                           | 157, 159                 | Perca flavescens .....                    | 129, 130, 134          |
| Namuito Island .....                        | 157                      | Perkins, H. F.....                        | 123                    |
| Namuka Group.....                           | 145                      | Petromyzon marinus unicolor.....          | 130                    |
| Namuka Ika.....                             | 145                      | Phalarope, Steamer .....                  | 23                     |
| Nashua Station.....                         | 23, 32                   | Philadelphia Fish Trade .....             | 262                    |
| Report .....                                | 42                       | Photography of Fishes .....               | 124                    |
| Neal, J. R.....                             | 127                      | Pickerel .....                            | 113, 134               |
| Neiafu.....                                 | 146                      | Pike .....                                | 113, 134               |
| Neosho Station Report.....                  | 77                       | Pike Perch .....                          | 47                     |
| Nero, U. S. S.....                          | 159                      | Culture in Vermont .....                  | 26                     |
| New England Fisheries .....                 | 174-177                  | on Lake Erie.....                         | 26                     |
| New England States, Statistics of Fisheries |                          | Distribution .....                        | 112                    |
| of.....                                     | 311-386                  | Pinaki.....                               | 139                    |
| New Hampshire Fish Commission .....         | 43                       | Pingelap .....                            | 156                    |
| New Hampshire Fisheries.....                | 341-342                  | Planting Oysters on Pacific Coast .....   | 120                    |
| New Jersey Fisheries.....                   | 223-254                  | Platts, George .....                      | 65                     |
| New Stations .....                          | 22                       | Plymouth, Mass .....                      | 7                      |
| New York Fisheries .....                    | 203-222                  | Pollock landed at Boston.....             | 168                    |
| Niue.....                                   | 144                      | Boston and Gloucester ..                  | 172                    |
| Northeast Pass.....                         | 140                      | Gloucester.....                           | 170                    |
| North Carolina Oyster-grounds.....          | 119                      | Pomolobus pseudoharengus.....             | 129                    |
| Northville Station.....                     | 32                       | Ponape .....                              | 156                    |
| Report .....                                | 64                       | Pond, R. H.....                           | 131                    |
| Noturus gyrinus.....                        | 134                      | Porto Rican Collections .....             | 19                     |
| Nukahiva .....                              | 137                      | Porto Rico, Aquatic Fauna of.....         | 135                    |
| Nukalofa .....                              | 144                      | Potomac River .....                       | 130                    |
| Nukatavake .....                            | 140                      | Crappie in.....                           | 30                     |
| Nukufetau Island .....                      | 151                      | Investigations.....                       | 19                     |
| Nurakita Island .....                       | 148                      | Shad Culture .....                        | 8                      |
| Nutting, C. C.....                          | 123, 124                 | Shad Run .....                            | 28                     |
| O'Bryant, B. F.....                         | 60                       | Prentiss, Charles W.....                  | 123                    |
| Oceanic, Steamer.....                       | 31                       | Pribilof Islands Fur-seal Rookeries ..... | 177                    |
| Ocean Sun-fish .....                        | 124                      | Pridgeon, John.....                       | 67                     |
| Ocean Trap Nets.....                        | 371                      | Propagation and Distribution of Food-     |                        |
| Oldenburg, G. H.....                        | 91                       | fishes, Report on .....                   | 25-118                 |
| Onoatua Island.....                         | 151                      | Propagation of Food-fishes .....          | 5-15                   |
| Oregon Investigations.....                  | 134                      | Pryor, J. C.....                          | 137                    |
| Osmerus abbotti.....                        | 128                      | Publications of Commission.....           | 23                     |
| Oyster Industry.....                        | 203, 204, 223, 263, 269, | Publications relative to the Work of the  |                        |
| 284, 285, 297, 361, 365, 366, 376, 377, 378 |                          | Albatross, Chronological Catalogue....    | 501-542                |
| Oyster Claires at Lynnhaven.....            | 17                       | Put-in Bay Station .....                  | 7, 26                  |
| Culture in North Carolina .....             | 17, 22                   | Report.....                               | 60                     |
| Rhode Island.....                           | 376                      | Quincy Station Report .....               | 71                     |



# 568 REPORT OF COMMISSIONER OF FISH AND FISHERIES.

|  | Page.                          |  | Page.                        |
|--|--------------------------------|--|------------------------------|
| Quinnat Salmon.....  | 5, 6, 57, 85, 90               | Seneca Lake.....   | 19, 129                      |
| Distribution.....  | 99                             | Serial Temperature Records.....  | 490-500                      |
| in Lake Ontario.....   | 30                             | Shad.....  | 5                            |
| Race, E. E.....  | 34                             | Shad Culture.....  | 8, 28, 49, 50, 51, 58        |
| Railroad Transportation.....   | 16                             | Distribution.....  | 98-99                        |
| Rainbow Trout.....   | 38, 39, 56, 59, 66, 73, 80, 92 | Fisheries Statistics..   | 210, 235, 258, 264, 275, 296 |
| Distribution.....  | 102-105                        | Station visited.....   | 33                           |
| Rairoa.....  | 138, 143                       | Shearwater, Steamer.....   | 60, 132                      |
| Ralick Chain.....  | 153                            | Shelby, W. H.....  | 56                           |
| Rand, Herbert W.....   | 123                            | Sherrell, Z. V.....  | 30                           |
| Raroia.....  | 140                            | Sherwood, George H.....  | 123                          |
| Rathbun, M. J.....   | 135                            | Shore, C. A.....   | 125                          |
| Ravenel, W. de C.....  | 18, 127                        | Shrimp Fishery of San Francisco Bay.....   | 182                          |
| Ravenel, W. de C., Report on Propagation<br>and Distribution of Food-fishes..... | 25-118                         | Shufeldt, R. W.....  | 124                          |
| Redfin.....  | 134                            | Silver Salmon.....   | 92, 93, 97                   |
| Reese, A. M.....   | 125                            | Distribution.....  | 100                          |
| Reighard, Jacob.....   | 19, 131, 132                   | Simpson, Charles T.....  | 135                          |
| Rewa River.....  | 146                            | Skipwith, Grey.....  | 137                          |
| Rhode Island Fisheries.....  | 364-379                        | Small-mouth Black Bass Distribution.....   | 116                          |
| Rich, A. W.....  | 127                            | Smiley, A. P.....  | 90                           |
| Ridgway, R. M.....   | 80                             | Smith, Hugh M.....   | 18, 127, 129                 |
| Risser, Jonathan.....  | 123                            | Smith, Hugh M., Report on Inquiry re-<br>specting Food-fishes and the Fishing-<br>grounds..... | 119-135                      |
| Roanoke River.....   | 58                             | Smith, James A.....  | 22, 49, 120, 122             |
| Roberts, W. A.....   | 163, 196                       | Smoked Fish.....   | 338                          |
| Robinson, R. K.....  | 64                             | Smoked Herring.....  | 339                          |
| Rock Bass.....   | 56, 57, 71, 74, 78             | Snow, Julia.....   | 131                          |
| Distribution.....  | 117                            | Snowy Grouper.....   | 54                           |
| Rodman, Hugh.....  | 137                            | Society Islands.....   | 153                          |
| Rogue River, Fish-culture on.....  | 6, 25                          | Sockeye Salmon Distribution.....   | 6, 26, 100                   |
| Station Report.....  | 92                             | Sophia Island.....   | 148                          |
| Rongelab.....  | 153                            | Sounding Machine.....  | 133                          |
| Rota.....  | 161                            | South Sea Expedition.....  | 137-161                      |
| Rotoava.....   | 140                            | South Seas, Investigations among.....  | 21                           |
| Rutter, Cloudsley.....   | 134                            | Spearfish Station Report.....  | 81                           |
| Sacramento Basin.....  | 134                            | Species and Genera described as new in<br>Albatross Papers.....                                | 543-559                      |
| River.....   | 134                            | Sponge.....  | 144                          |
| Fish-culture on.....   | 25                             | Squeteague.....  | 365                          |
| Salmon Fishery of Penobscot River and<br>Bay.....                                | 333                            | Stanley, H. O.....   | 30                           |
| Salmon Fry held in Troughs.....  | 6                              | Starfish.....  | 377                          |
| Propagation on Pacific Coast.....  | 25                             | Starfish, Anatomy of.....  | 124                          |
| Salmo irideus.....   | 188                            | Statistical Inquiries.....   | 20                           |
| sebago.....  | 128                            | Station Reports:   |                              |
| Salvelinus fontinalis.....   | 128, 188                       | Aquarium at Central Station.....   | 54                           |
| namaycush.....   | 130                            | Baird.....   | 85                           |
| San Francisco Bay, Eastern Oysters in.....                                       | 179                            | Baker Lake.....  | 96                           |
| Shrimp Fishery.....  | 182                            | Battery.....   | 49                           |
| San Luis d'Apra.....   | 160                            | Battle Creek.....  | 90                           |
| San Marcos Station Report.....   | 76                             | Bozeman.....   | 83                           |
| San Pedro River.....   | 19, 135                        | Bryan Point.....   | 51                           |
| Sardines.....  | 335, 336                       | Cape Vincent.....  | 47                           |
| Sargent, Porter E.....   | 123                            | Central.....   | 53                           |
| Sault Ste. Marie Hatchery.....   | 6                              | Clackamas.....   | 91                           |
| Schneider, G. A.....   | 57                             | Craig Brook.....   | 36                           |
| Scotch Sea Trout.....  | 38, 111                        | Duluth.....  | 70                           |
| Scovell, J. T.....   | 133                            | Edenton.....   | 57                           |
| Scup.....  | 364                            | Erwin.....   | 59                           |
| Sea Elephants.....   | 344                            | Fish Hawk.....   | 49                           |
| Seaford Fish Trade.....  | 267                            | Fish Lakes.....  | 52                           |
| Seagle, George A.....  | 55                             | Gloucester, Mass.....  | 45                           |
| Seal Herds of Alaska.....  | 21                             | Green Lake.....  | 34                           |
| Sebago Lake.....   | 18, 129                        | Leadville.....   | 79                           |
| Semotilus atromaculatus.....   | 128                            | Little White Salmon.....   | 94                           |
| corporalis.....  | 128                            | Manchester.....  | 72                           |
| Senator, Steamer.....  | 34                             |  |                              |

|  | Page.                                 |  | Page.                        |
|--|---------------------------------------|--|------------------------------|
| Station Reports—Continued.                 |                                       | Tow-net Stations of the Albatross, Inter-      |                              |
| Nashua .....                               | 42                                    | mediate and Surface .....                      | 477-488                      |
| Neosho .....                               | 77                                    | Townsend, C. H. ....                           | 137, 163, 196, 313, 387      |
| Northville .....                           | 64                                    | Townsend, C. H., Dredging and other Rec-       |                              |
| Put-in Bay .....                           | 60                                    | ords of the U. S. Fish Commission steamer      |                              |
| Quincy .....                               | 71                                    | Albatross, with Bibliography relative to       |                              |
| Rogue River .....                          | 92                                    | the work of the vessel .....                   | 387-562                      |
| St. Johnsbury .....                        | 39                                    | Townsend, C. H., on Statistics and Methods     |                              |
| San Marcos .....                           | 76                                    | of Fisheries .....                             | 163-184                      |
| Spearfish .....                            | 81                                    | Townsend, C. H., on Statistics of Fisheries    |                              |
| Woods Hole .....                           | 44                                    | of the New England States .....                | 311-386                      |
| Wytheville .....                           | 55                                    | Townsend, C. H., on Statistics of Fisheries of |                              |
| Stations, New .....                        | 22                                    | the Middle Atlantic States .....               | 195-310                      |
| List of .....                              | 29                                    | Transportation furnished by Railroads ....     | 16                           |
| Statistics and Methods of Fisheries, Re-   |                                       | Trawling and Dredging Records of the Al-       |                              |
| port on .....                              | 163-184                               | batross .....                                  | 393-419                      |
| Statistics of Fisheries of Middle Atlantic |                                       | Treadwell, A. L. ....                          | 135                          |
| States .....                               | 195-310                               | Tropidonotus .....                             | 134                          |
| Statistics of Fisheries of New England     |                                       | Truk Group .....                               | 157                          |
| States .....                               | 311-386                               | Tuanaka .....                                  | 140                          |
| Steelhead Trout .....                      | 6, 26, 34, 38, 39, 67, 71, 81, 84, 93 | Tulian, E. A. ....                             | 79                           |
| in Montana .....                           | 6, 30                                 | Turrendine, J. W. ....                         | 125                          |
| Distribution .....                         | 100-101                               | Tyzzar, E. E. ....                             | 123, 122                     |
| Stevenson, C. H. ....                      | 163, 196, 313                         | Ua-Huka .....                                  | 137                          |
| Stewartson, Arthur J. ....                 | 123                                   | Uala Island .....                              | 157                          |
| Stickney, M. W. ....                       | 123, 124                              | Vaihiria Lake .....                            | 142, 143                     |
| St. Johnsbury Station .....                | 32                                    | Van Gieson, Ira .....                          | 123                          |
| Report .....                               | 39                                    | Vaughan, T. Wayland .....                      | 135                          |
| Stone, Livingston .....                    | 30, 47                                | Vavau Group .....                              | 145                          |
| Stranahan, J. J. ....                      | 60, 63                                | Vegetation of Kusaie .....                     | 156                          |
| Strawberry Bass .....                      | 78, 117                               | Vermont, Pike Perch in .....                   | 7                            |
| Striped Bass .....                         | 50                                    | Virginia Fisheries .....                       | 288-310                      |
| Strong, Oliver S .....                     | 123                                   | Viti Levu .....                                | 146, 148                     |
| Strong, R. M. ....                         | 123                                   | Wabash Basin .....                             | 19, 132                      |
| Sturgeon .....                             | 48, 223, 224, 263, 267, 269, 298, 380 | Wallich, Clandius, on a method of record-      |                              |
| Summary of Distribution .....              | 15                                    | ing Egg Development, for use of Fish-cul-      |                              |
| Sun-fish Distribution .....                | 53, 71, 117                           | turists .....                                  | 185-194                      |
| Susquehanna River Shad Culture .....       | 8                                     | Walter, H. E. ....                             | 123                          |
| Suva .....                                 | 146, 148                              | Walton, L. B. ....                             | 123                          |
| Swanton, Vermont .....                     | 47                                    | Ward, Henry B. ....                            | 131, 132, 135                |
| Sword-fish .....                           | 361, 366, 386                         | Warmouth Bass Distribution .....               | 71, 117                      |
| Sylvester, C. F. ....                      | 123                                   | Waste Products of Fisheries .....              | 18                           |
| Sylvester, G. W. ....                      | 123                                   | Water Supply at Green Lake Station .....       | 35                           |
| Taenga .....                               | 140                                   | Watson, F. E. ....                             | 123                          |
| Tagging Cod .....                          | 7                                     | Weaving Cloth in South Sea Islands .....       | 159                          |
| Tahaa .....                                | 144                                   | Welshman .....                                 | 134                          |
| Tahanea .....                              | 140                                   | West Virginia, Investigations in .....         | 19, 130                      |
| Tahiti .....                               | 139, 142                              | Whale Fishery .....                            | 178, 316, 344                |
| Tai-o-hae .....                            | 138                                   | Wheeler, W. M. ....                            | 123, 124, 135                |
| Takume .....                               | 140                                   | White-fish .....                               | 5, 48, 92                    |
| Tanner, Z. L. ....                         | 392                                   | Culture .....                                  | 6, 7, 26, 60, 61, 64, 67, 70 |
| Taputeuea Island .....                     | 151                                   | Distribution .....                             | 112                          |
| Tarawa Island .....                        | 151                                   | White Perch .....                              | 7, 134                       |
| Taritari .....                             | 151, 153                              | Wholesale Fish Trade .....                     | 222, 254, 262,               |
| Thayer, W. W. ....                         | 96                                    | 267, 285-287, 309, 310, 338, 361-363, 378, 386 |                              |
| Thelphusidæ .....                          | 143                                   | Wilcox, W. A. ....                             | 163, 196, 313                |
| Thompson, Millet T. ....                   | 123                                   | Willamette River .....                         | 26                           |
| Thorndike, Edward L. ....                  | 123                                   | Willapa Bay .....                              | 17                           |
| Tikehau .....                              | 139                                   | Willard, W. A. ....                            | 123                          |
| Tippecanoe River .....                     | 132                                   | Williams, S. R. ....                           | 123                          |
| Titcomb, J. W. ....                        | 49                                    | Wilmington Fish Trade .....                    | 267                          |
| Tolbert, G. H. ....                        | 83                                    | Wilson, E. B. ....                             | 125                          |
| Tonga Archipelago .....                    | 145                                   | Wilson, H. V. ....                             | 125, 135                     |
| Torrey, H. B. ....                         | 125                                   | Wilson, John B. ....                           | 163, 196, 213                |
| Torrey, J. C. ....                         | 125                                   | Winona Lake .....                              | 132                          |
| Tower, R. W. ....                          | 123                                   | Winslow, G. M. ....                            | 123                          |

|                              | Page.          |                               | Page.    |
|------------------------------|----------------|-------------------------------|----------|
| Wires, S. P .....            | 70             | Wotje .....                   | 153      |
| Wisner, J. N. ....           | 49, 91, 94, 96 | Wyoming Fish Commission ..... | 82       |
| Wolverine Fish Company ..... | 67             | Wytheville Station .....      | 31, 55   |
| Woods Hole Laboratory .....  | 18, 122        | Yellow Perch .....            | 113, 134 |
| Station .....                | 7, 32, 44      | Yerkes, R. M. ....            | 123      |
| Woodworth, W. McM .....      | 137            | Yokohama .....                | 160      |
| Worth, S. G .....            | 57, 59         | Young, Leonard .....          | 133      |

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